
Supplemental Technical Specification for

Floating Turbidity Curtain

SCDOT Designation: SC-M-815-22 (07/26)

By: _____
FEDERAL HIGHWAY ADMINISTRATION

1.0 Description

A floating turbidity curtain is a synthetic fabric barrier which is suspended within a body of water, supported by floatation material on the top edge, and held in a vertical position by a ballast on the bottom edge. Floating turbidity curtains are designed to restrict the flow of sediment laden runoff from a land disturbance, to keep it confined to a limited area, and to allow the silt and sediment to be trapped. They are designed to prevent the spread of sediment into downstream or connecting surface waters by keeping the material in a static holding area until it can settle.

1.0.1 Floating Turbidity Curtain Selection

Provide the floating turbidity curtain manufacturer with current velocity and watercourse depth appropriate for the area to be contained. Follow manufacturers' requirements for product selection based on current velocity and watercourse depth and ensure all Federal Highway Administration (FHWA) requirements are met.

Use Type I barriers in calm waters with no currents or tide and minimal wind and wave action. Appropriate locations include shallow lakes, ponds, marshes, and small streams.

Use Type II barriers in slow to moderate current waters. Appropriate locations include deep lakes, intermediate streams, and areas with minimal tidal currents.

Use Type III barriers in high current waters or waters subject to high wind and wave action. Appropriate locations include intercoastal waterways, deep lakes, and tidal areas.

1.1 Materials

Provide floating turbidity curtains for sediment control that meets the requirements outlined in Table 1. Do not use floating turbidity curtains with a permeable filter fabric insert. For marine or coastal applications, use connecting hardware that is resistant to saltwater corrosion.

Table 1: Minimum Floating Turbidity Curtain Material Properties

Property	Test Method	Type I	Type II	Type III
Weight (oz/yd ²)	ASTM D3776	18	22	22
Minimum Grab Tensile Strength Machine Direction (lb)	ASTM D4632	300		
Minimum Grab Tensile Strength Cross Direction (lb)	ASTM D4632	250		
Trapezoid Tear Strength Machine Direction (lb)	ASTM D4533	100		
Trapezoid Tear Strength Cross-Machine Direction (lb)	ASTM D4533	60		
Mullen Burst ¹ (lb/in ²)	ASTM D3786	480		
Hydrostatic Resistance ¹ (lb/in ²)	ASTM D751	660		
Flotation ² (lbs/ft)	-	13	22	22
Supporting Flotation (in, equivalent)	-	6	8	12
Breaking Strength Cable Connector (lbs)	-	-	9,000	9,000
Bottom Load Chain (lb/ft)	-	0.63 (1/4 in)	0.95 (5/16 in)	0.95 (5/16 in)

¹ For coated fabrics, Hydrostatic Resistance may be demonstrated instead of Mullen Burst.

² Flotation required is for a standard 5ft curtain depth.

1.1.1 Quality Assurance

Provide Floating Turbidity Curtains listed on the most recent edition of *SCDOT Qualified Product List 112* in the appropriate category.

At the time of delivery, provide the Resident Construction Engineer (RCE) with the floating turbidity curtain packing list containing complete identification, including but not limited to the following:

- Manufacturer's name and location,
- Manufacturer's telephone number,
- Manufacturer's e-mail address and web address,
- Floating turbidity curtain name, model, and/or serial number,
- Floating turbidity curtain length, height, and material properties, and
- Certification that the floating turbidity curtain meets the physical and performance criteria of this specification.

1.2 Construction Requirements

1.2.1 Equipment

Ensure that the equipment necessary for the proper installation of the work is onsite, in acceptable working condition, and approved by the RCE before the start of work. Provide sufficient equipment to enable execution of the work in accordance with the project schedule.

1.2.2 Installation

1.2.2.1 General Installation Requirements (All Types)

Follow the manufacturer's installation instructions.

Install floating turbidity curtains prior to the start of construction activities that could impact the waterway.

Install floating turbidity curtains parallel to the direction of flow of a moving water body, if applicable. Do not install curtains across the main areas of flow of a moving water body. Do not install curtains where the flow of water will disturb accumulated sediment or alter the curtain's location.

Floating turbidity curtains should not be used in current velocities greater than 5.0 ft/second unless there are exceptional circumstances and special designs are considered.

Use barriers with a bright color (yellow or orange are recommended) that attract the attention of nearby boaters. Use lighted buoys in areas of frequent boat traffic or where nighttime boat navigation occurs. Buoys used for floating turbidity curtains will comply with the South Carolina Department of Natural Resources law enforcement buoy specifications.

Use barrier fabric that meets the minimum requirements of this specification for the appropriate application.

Use fabric with seams that are vulcanized, welded, or sewn, and develop the full strength of the fabric.

Use floatation devices with sufficient buoyancy to support the weight of the barrier and maintain the required minimum freeboard above the water surface as stated in Table 1.

Place floating turbidity curtains parallel to the direction of flow of a moving body of water. Never place floating turbidity curtains across the entire width of a river or stream.

When possible, use a minimum continuous span of 50 feet between joints (anchors or stake locations).

Do not exceed a maximum span of 100 feet between anchors and stakes.

When more than one width of fabric is required, overlap by a minimum of 6 inches.

Extend the ends of the barrier, both floating upper and weighted lower into the shoreline, especially if high water conditions are expected. Secure the ends firmly to the shoreline to fully enclose the area where sediment may enter the water.

1.2.2.2 Specific Installation Requirements

1) Type I Installations

For Type I installations, set the shore stakes/anchors or anchor points (using anchor buoys if bottom anchors are employed), and tow out the barrier in the furled state and attach it to the stakes or anchor points. Then, loosen the furling lines, allowing the barrier skirt to drop. Furling lines are a valuable option to include on the barrier for ease of installation and removal. Type I curtains do not require intermediate anchor points. For Type I installations, install the curtain through the entire depth of the water body.

2) Type II Installations

For Type II installations, do not extend the floating turbidity curtain deeper than 10 feet below the water surface unless special anchorage is provided with design calculations for the load bearing components. Floating turbidity curtains with large depths are subject to loads which can exceed

the working cable loads. A barrier installed in this manner can billow up towards the surface under the pressure of the moving water; significantly decreasing the effective depth of the barrier.

For Type II installations, it is important to set all anchor points prior to installation of the furled barrier. Ensure that anchor points are of sufficient holding power to retain the barrier under the existing current conditions. Ensure employment of anchor buoys on all anchors to prevent the current from submerging the flotation at the anchor points. When floating turbidity curtains are installed in tidal areas, provide anchors on both sides of the barrier for two reasons:

- To minimize barrier movement during tidal current reversals.
- To ensure that the barrier does not overrun the anchors and pull out when the tide reverses.

Once the anchors are secure, attach the furled barrier first to the anchor point that is furthest upstream, and then attach anchors sequentially to each downstream anchor point until the entire barrier is in position. At this point, and before unfurling, assess the position layout of the barrier and make any necessary adjustments to the anchors. When the final barrier location is established, loosen the furling lines to allow the skirt to drop. Maintain a minimum 1-foot clearance between the ballast line and the bottom of the skirt at mean low water in installations where tidal currents are present. Movement of the lower skirt over the bottom surface due to tidal reverses or wind and wave action on the flotation system may fan and stir sediments that have already settled.

Always attach anchor lines to the flotation device, not to the bottom of the barrier. The anchoring line attached to the downstream side of the flotation device provides support for the barrier. Attaching the anchors to the bottom of the barrier can cause premature failure of the barrier.

Extend the ends of the barrier up onto the shoreline. Secure the ends firmly to the shoreline to rigid bodies such as trees or piles. Consider anticipated high-water conditions and secure the barrier high enough on the shoreline such that it will remain effective.

Provide a 1/2-inch or greater nylon rope as an adjustment line for mooring system. Ensure the line is securely attached and is sufficiently buoyant to float under normal load conditions.

3) Type III Installations

For Type III installations, follow the same installation procedures outlined for Type II installations. This includes all requirements related to anchor point layout, anchoring sequence, barrier positioning, shoreline securing, and adjustment line provisions. The installation steps used for Type II barriers shall be applied in full unless otherwise specified.

1.2.2.3 Connection Requirements Between Spans

1) Type I Connections

Use polypropylene rope with a minimum diameter of 5/8-inch and grommet-type connections for securing the curtain components. All rope and grommets shall be corrosion-resistant, UV-stable, and suitable for continuous aquatic exposure.

2) Type II Connections

Use either:

- A slotted connector pipe sized to maintain panel alignment and prevent excessive flexing under hydraulic loading
- Polypropylene rope and grommet connections that meet the minimum rope diameter and durability requirements specified for Type I

3) Type III Connections

Use a slotted PVC connector pipe equipped with a metal-reinforced collar to ensure structural rigidity and resistance to deformation. All components shall be designed to withstand repeated installation stresses and long-term submersion. In addition, at minimum two each 5/16-inch vinyl

sheathed extra high strength aircraft wire steel cables with galvanized connectors providing additional support at the connections between spans.

1.2.2.4 Load Lines and Anchoring Requirements

Follow manufacturers' requirements for load lines between spans and anchoring system design based on the current velocity and watercourse depth in the containment area.

1) Type I Load Lines and Anchoring Requirements

Type I barriers do not require load lines. Anchors or shore stakes can be used at end points for Type I installations when practical. For Type I installations, use external anchors or shore stakes made of wooden or metal stakes (2 x 4-inch or 2.5-inch minimum diameter wood, or 1.33 lbs./linear foot steel).

2) Type II Load Lines and Anchoring Requirements

Ensure that load lines are fabricated into the bottom of Type II barriers. Type II barriers require a minimum 5/16-inch dual galvanized wire rope load line with a heavy vinyl coating.

Ensure mid-span anchors are sufficient to hold the barrier in a static position relative to the bottom of the watercourse, without interfering with the action of the barrier. The anchor may dig into the bottom (grappling hook, plow or fluke-type), or may be weighted (mushroom type), and is attached to a floating anchor buoy via an anchor line. Run the anchor line from the buoy to the top load line of the barrier.

3) Type III Load Lines and Anchoring Requirements

Ensure that Type III applications have load lines fabricated into the bottom and top of the fabric. Type III barriers require a minimum 2 of each 5/16-inch extra high strength aircraft wire steel cables with a minimum breaking force of 18,400 lbs. with galvanized connectors. The top load line consists of woven webbing or vinyl-sheathed steel cable with a break strength of more than 10,000 lbs. The bottom load line consists of a chain incorporated into the bottom hem of the barrier, with adequate weight to serve as ballast to hold the barrier in a vertical position. Provide additional load lines and support when practical and as needed. Use load lines with suitable connecting devices to develop the full breaking strength for connecting to load lines in adjacent sections.

Ensure mid-span anchors are sufficient to hold the barrier in a static position relative to the bottom of the watercourse, without interfering with the action of the barrier. The anchor may dig into the bottom (grappling hook, plow or fluke-type), or may be weighted (mushroom type), and is attached to a floating anchor buoy via an anchor line. Run the anchor line from the buoy to the top load line of the barrier. When used with Type III installation, anchor lines must contain enough slack to allow the buoy and barrier to float freely with tidal changes without pulling the buoy or barrier down. Anchor lines must be checked regularly to ensure that they do not become entangled with debris. Anchor spacing varies with current velocity and wind and wave action; strictly follow the manufacturer's recommendations for the required anchor spacing.

1.2.3 Inspection and Maintenance

Turbidity barriers should be inspected daily to ensure they are functioning properly. Inspect immediately following any storm event or high-wind, high-current situation to ensure the barrier hasn't been damaged or dislodged. During inspection, check for tears or other damage, displacement of barrier, secure anchoring, sediment buildup, and that the top edge remains above the water surface. Repair or replace damaged sections immediately. Remove accumulated sediment and debris. Only remove the barrier after work is completed and sediment has settled. Follow manufacturer recommendations for specific maintenance activities.

1.2.4 Removal

The floating turbidity curtain skirt should be protected from damage by furling the barrier before it is removed from the water. The area selected to bring the barrier ashore should be free of sharp rocks, broken cement, debris, etc., to minimize damage when hauling the barrier over the area. When removing deep-skirted, non-furling barriers, it is recommended to use a small boat and crew to install furling lines along the structure first to protect it. When the barrier is no longer required, as determined by the RCE, remove the barrier and related components in a manner that minimizes resuspending sediment particles. Ensure all remaining sediment is sufficiently settled before removing the barrier. Sediment must be removed and the original depth (or plan elevation) restored. Remove all spoils and transport them to an upland area and stabilize.

1.2.5 Acceptance

Obtain RCE acceptance and approval of floating turbidity curtain installations, replacements, or repairs.

1.3 Measurement

The quantity of the pay item floating turbidity curtain (*Type I, Type II, and Type III*) is the length of floating turbidity curtain installed if the depth is specified in the Contract, or if the depth is not specified, then by the surface area of the floating turbidity barrier furnished, installed, maintained and is measured by either the linear foot (LF) or the square foot (SF) as applicable for type of barrier in place, complete, and accepted. Measurement of accumulated material removed and disposed of each time the device is cleaned out is included in the quantity for Cleaning Silt Basins.

1.4 Payment

Payment for floating turbidity curtain (*Type I, Type II, and Type III*) is full compensation for installing floating turbidity curtains as specified or directed and includes furnishing, installing, maintaining, removing and disposing of the floating turbidity curtains; providing attachments to the shore, anchors, vertical supports, anchor buoys, ballast, buoyed warning signs, lighted buoys; 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.

Item No.	Pay Item	Unit
8153100	Floating Turbidity Curtain - Type I	SF
8153200	Floating Turbidity Curtain - Type II	SF
8153300	Floating Turbidity Curtain - Type III	SF
81531XX	Floating Turbidity Curtain - Type I (XX)' Deep	LF
81532XX	Floating Turbidity Curtain - Type II (XX)' Deep	LF
81533XX	Floating Turbidity Curtain - Type III (XX)' Deep	LF
8154010	Cleaning Silt Basins	CY