

INLET STRUCTURE FILTERS

SCDOT Designation: SC-M-815-8 (07/17)

1.0 Inlet Structure Filters

This Supplemental Specification replaces sections 815.1.1.3, 815.2.4, 815.4.11, 815.5 paragraphs 11 and 12, and 815.6 paragraph 11 for Inlet Structure Filters in the *South Carolina Department of Transportation Standard Specifications for Highway Construction*, 2007 Edition.

1.1 Description

Inlet structure filters are temporary filtering devices placed around pipe inlet structures to trap sediment and keep silt, sediment and construction debris from entering pipe systems through open inlet structures. Additionally, inlet structure filters prevent the silting-in of inlets, storm drainage systems and receiving channels. Locations for installation are designated on the Plans or by the RCE.

The criteria for the use of Inlet Structures Filters Types A, B, D, E, F and G are identified in Subsections 1.1.1 through 1.1.6. Inlet structure filters are classified into 6 separate types:

1.1.1 Type A- Low Flow Inlet Filters

Install a Type A low flow inlet filter for inlets with peak flow rates **less than 1 ft³/sec**, the inlet drain area grade is less than 5%, and the immediate drainage area (5-foot radius around the inlet) grade is less than 1%. Do not use Type A inlet filters for areas receiving concentrated flow.

1.1.2 Type B- Medium Flow, Low Velocity Inlet Filters

Install a Type B medium flow, low velocity inlet filter for inlets with peak flow rates **less than 3 ft³/sec**, the inlet drain area grade is less than 5%, and the flow velocity to the inlet does **not** exceed **3 ft/sec**. Use Type B filters where an overflow capacity is not required to prevent excessive ponding around the inlet structure.

1.1.3 Type D- High Flow, High Velocity Inlet Filters

Install a Type D high flow, high velocity inlet filter for drainage areas up to **2 acres**, for inlets where peak flow rates may exceed **3 ft³/sec**, the inlet drain area grade may exceed 5%, and the flow velocity to the inlet may exceed **3 ft/sec**. Use Type D1 filters for median applications. Use Type D2 filters for sump applications. Use Type D1 or D2 filters where an overflow capacity **is** required to prevent excessive ponding around the structure and to protect inlet structures not associated with curb inlets. Use Type D filters to protect inlet structures such as Catch Basin Type 9, yard inlets, Drop Inlet 24 inches by 24 inches, Drop Inlet 24 inches by 36 inches, and manholes.

1.1.4 Type E- Surface Course Curb Inlet Filters

Install a Type E surface course curb inlet filter to protect Catch Basin Types 1, 16, 17 and 18 after the road surface course is placed.

1.1.5 Type F- Inlet Tubes

Type F inlet tubes are classified in two categories: weighted inlet tubes and non-weighted inlet tubes.

Install a weighted Type F inlet tube to protect Catch Basin Types 1, 9, 12, 14, 15, 16, 17, 18, Drop Inlets 24 inches by 24 inches, Drop Inlet 24 inches by 36 inches, manholes and trench drains with drainage areas less than **1 acre**. Place weighted Type F inlet tubes on gravel, concrete, asphalt or other hard surfaces around

drainage inlets where stakes cannot be driven. Install weighted inlet tubes where construction traffic may occur around the inlet.

All weighted Type F inlet structure filters are applicable as Type E inlet structure filters.

Use non-weighted Type F inlet tubes as inlet filters for Catch Basin Types 1, 16, 17 and 18 with drainage areas less than **1 acre** where stakes or posts can be driven. Place non-weighted Type F inlet tubes on subgrade. Non-weighted Type F inlet tubes are applicable until the road base course is placed.

Use non-weighted Type F inlet tubes as slope interruption devices for erosion prevention on slopes greater than 50 feet in length for Hydraulic Erosion Control Products (HECP) and Temporary Erosion Control Blanket (ECB) slope applications. At the discretion of the RCE, use slope interruption devices on slope lengths less than 50 feet when slope erosion is observed.

Use both weighted and non-weighted Type F inlet tubes as weep hole inlet filters. Use non-weighted Type F inlet tubes only where stakes can be driven into the ground or subgrade to secure the tube.

1.1.6 Type G- Suspended Internal Inlet Filters

Install a Type G suspended internal inlet filter for inlets with drainage areas less than **1 acre and** peak flow rates to the inlet **less than 3 ft³/sec.** Use Type G suspended inlet filters to protect inlet structures such as Catch Basin Type 9, yard inlets, Drop Inlet 24 inches by 24 inches, Drop Inlet 24 inches by 36 inches, and manholes

Use Type G internal inlet filters that are manufactured to fit the opening of the catch basin or drop inlet. Use Type G internal inlet filters during construction to prevent silt and sediment from entering drainage systems while allowing water to pass through freely.

1.2 Materials

1.2.1 Type A- Low Flow Inlet Filters

1.2.1.1 Filter Fabric Inlet Protection

Provide Filter Fabric from the most recent edition of *SCDOT Qualified Products List 34*.

Furnish Steel Posts a minimum of 5 feet long meeting the minimum physical requirements:

- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard “T” section with a nominal face width of 1.38-inches and nominal “T” length of 1.48-inches.
- Weigh 1.25 pounds per foot (± 8%).
- Painted with a water based baked enamel paint.

Provide heavy duty plastic ties to attach the fabric to posts.

Provide filter fabric meeting the minimum requirements of the following table.

Property	Test Method ¹	Value
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D4491	100 gal/min/ft ² minimum
Tensile Strength	ASTM D4632	90 lbs
Ultraviolet Stability (Retained strength after 500 hrs)	ASTM D4355	70%

¹ Unless otherwise indicated, numerical values represent the Minimum Average Roll Value (MARV).

1.2.1.2 Sediment Tube Inlet Protection

Provide Sediment Tubes from the most recent edition of *SCDOT Qualified Products List 57*.

Furnish Wood Stakes meeting the minimum physical requirements:

- Minimum 4 feet long.
- Minimum measured dimension of 3/4 inch x 3/4 inch.
- Maximum measured dimension of 2 inches x 2 inches.

Furnish Steel Posts meeting the minimum physical requirements:

- Minimum 4 feet long.
- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard “T” section with a nominal face width of 1.38-inches and nominal “T” length of 1.48-inches.
- Weigh 1.25 pounds per foot ($\pm 8\%$).
- No kick plate.
- Painting not required.

Provide sediment tube inlet protection meeting the minimum requirements of the following table.

Property	Test Method	Value
Pre-installed Tube Diameter	Field Measured	18.0-inch minimum 24.0-inch maximum
Uniform Mass per Unit Length (uniform weight per liner foot)	Field Measured	3.0 lbs/ft $\pm 10\%$ minimum for 18-in diameter, 4.0 lbs/ft $\pm 10\%$ minimum for 24-in diameter
Length per Tube	Field Measured	10-ft minimum ¹
Tube Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D4491 or Equivalent	100 gal/min/ft ² minimum
Netting Ultraviolet Stability (Retained strength after 500 hrs)	ASTM D4355	70%

¹ Select length to minimize number of sediment tubes needed. If the ditch check length (perpendicular to the water flow) is 15 feet, then one 15-foot sediment tube is preferred over two overlapped 10-foot sediment tubes.

1.2.2 Type B- Medium Flow, Low Velocity Inlet Filters

1.2.2.1 Hardware Fabric and Stone Inlet Protection

Provide hardware fabric or comparable wire mesh with maximum openings of 0.5 inch x 0.5-inch as the supporting material.

Furnish Steel Posts a minimum of 4 feet long meeting the minimum physical requirements:

- Composed of high strength steel with minimum yield strength of 50,000 psi.
- Standard “T” section with a nominal face width of 1.38-inches and nominal “T” length of 1.48-inches.
- Weigh 1.25 pounds per foot ($\pm 8\%$).
- Painted with a water based baked enamel paint.

Provide heavy-duty wire ties to attach the wire mesh material to posts. Place Aggregate No. 5 or No. 57 washed stone against the hardware fabric on all 4 sides of the inlet.

1.2.3 Type D- High Flow, High Velocity Inlet Filters

Provide a Type D high flow, high velocity inlet filter composed of a rigid structure that completely surrounds the inlet, when applicable ensure the filter fabric is non-biodegradable and resistant to degradation by ultraviolet exposure and resistant to contaminants commonly encountered in stormwater.

Provide a rigid structure resistant to degradation by ultraviolet exposure and resistant to contaminants commonly encountered in stormwater. Provide a rigid structure that is reusable.

Do not use rigid structures composed of steel, re-bar, concrete or wood within the unprotected temporary construction clear zone of 30-feet for interstates and 15-feet for non-interstate applications.

When a filter fabric is utilized, provide a filter fabric constructed to provide a direct fit adjacent to the associated rigid structure and is capable of reducing effluent sediment concentrations by not less than 80% under typical sediment migration conditions.

Provide a Type D high flow, high velocity inlet filter that has a two-stage design. Ensure the first stage conveys normal flows at a minimum clean water flow rate of 100 gallons per minute per square foot, and the second stage conveys high flow rates with a minimum clean water flow rate of 200 gallons per minute per square foot, capable of collecting floatables and debris, with a maximum apparent opening of 0.5-inch per square inch (No. 12 standard sieve opening).

Ensure Type D1 inlet structure filters used for medians have a first stage minimum height of 9-inches and a first stage maximum height of 12-inches.

Ensure Type D2 inlet structure filters used for sump applications have a first stage minimum height of 12-inches and a first stage maximum height of 30-inches in order to allow greater ponding in the sump.

Provide a Type D high flow, high velocity inlet filter that has lifting devices or structures to assist in the installation and to allow inspection of the storm water system.

Provide a Type D high flow, high velocity inlet filter that meets the minimum performance requirements shown in the following table.

Property	Test Method ¹	Value
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
First Stage Clean Water Flow Rate	ASTM D4491	100 gal/min/ft ² minimum
Second Stage Clean Water Flow Rate	ASTM D4491	200 gal/min/ft ² minimum
When Filter Fabric is Utilized		
Filter Fabric Tensile Strength	ASTM D4632	80 lbs
Filter Fabric Ultraviolet Stability (Retained strength after 500 hrs of ultraviolet exposure)	ASTM D4355	70%

¹ Unless otherwise indicated, numerical values represent the Minimum Average Roll Value (MARV).

1.2.4 Type E- Surface Course Curb Inlet Filters

Provide a Type E surface course inlet filter composed of a uniform filter fabric covering an internal filter material which has compartments for stone, sand or other weighted materials, or physical mechanisms to hold the unit in place.

Furnish a Type E surface course inlet filter that has a maximum height that does not completely block the inlet opening and a minimum length that is 2-feet longer than the length of the curb opening for filters that do not use a physical mechanism to hold the unit in place. Do not completely block the inlet opening with Type E surface course filters to ensure overflow can enter the inlet opening.

Provide a Type E surface course inlet filter composed of a uniform filter fabric that is non-biodegradable and resistant to degradation by ultraviolet exposure and resistant to contaminants commonly encountered in stormwater.

Provide a Type E surface course inlet filter with filter material that allows stormwater to freely flow while trapping sediment and debris. Ensure that the filter material is resistant to contaminants commonly encountered in storm water. Do not use straw bales, pine bales, leaf mulch, or grass clippings as filter materials.

When a Type E surface course inlet filter utilizes a rigid structure, provide a reusable rigid structure resistant to degradation by ultraviolet exposure and resistant to contaminants commonly encountered in stormwater.

Do not use rigid structures composed of steel, re-bar, concrete or wood within the unprotected temporary construction clear zone of 30-feet for interstates and 15-feet for non-interstate applications

Ensure the filter fabric of the curb inlet filter is capable of reducing effluent sediment concentrations by no less than 80% under typical sediment migration conditions. Provide a Type E surface course inlet filter that meets the minimum performance requirements shown in the following table.

Property	Test Method ¹	Value
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Filter Fabric Clean Water Flow Rate	ASTM D4491	100 gal/min/ft ² minimum
Filter Fabric Tensile Strength	ASTM D4632	80 lbs
Filter Fabric Ultraviolet Stability (retained strength after 500 hrs of ultraviolet exposure)	ASTM D4355	70%

¹ Unless otherwise indicated, numerical values represent the Minimum Average Roll Value (MARV).

1.2.5 Type F- Inlet Tubes

Do not use straw bales, pine bales, leaf mulch, and or grass clippings.

Provide a Type F inlet tube that exhibit the following properties:

- Machine produced by a manufacturer experienced in sediment tube manufacturing.
- Materials are certified 100% weed free.
- When curled excelsior wood fiber is used, 80% of the fiber materials are a minimum of four (4) inches in length.
- When washed shredded recycled rubber particles are used for weighted inlet tubes, a minimum of 98% of metal is removed.
- Materials are enclosed by a tubular, flexible outer netting treated with ultraviolet stabilizers.

Do not use straw, curled excelsior wood, or natural coconut rolled erosion control products (RECPs) that are rolled up to create a Type F inlet tube.

1.2.5.1 Weighted Inlet Tubes

Provide a Type F weighted inlet tube that is a sediment tube capable of staying in place without external securing mechanisms and has a continuous uniform weighted inner core providing a uniform weight per unit length to keep it in place. Provide a Type F weighted inlet tube that meets the minimum performance requirements shown in the following table.

Property	Test Method	Value
Pre-installed Tube Diameter	Field Measured	6.0 inch to 12.0 inch
Uniform Mass per Unit Length (uniform weight per liner foot)	Field Measured	6 inch = 6 lbs/ft minimum 9 inch = 9 lbs/ft minimum 12 inch = 12 lbs/ft minimum
Length per Tube	Field Measured	6 foot minimum
Tube Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D4491 or Equivalent	100 gal/min/ft ² minimum
Netting Ultraviolet Stability (retained strength after 500 hr)	ASTM D 4355	70%

All weighted Type F inlet structure filters are applicable as Type E inlet structure filters.

1.2.5.2 Non-Weighted Inlet Tubes

Provide stakes or other means to stabilize Type F non-weighted inlet tubes to keep them safely in place. Provide a Type F non-weighted inlet tube that meets the minimum performance requirements shown in the following table.

Property	Test Method	Value
Pre-installed Diameter	Field Measured	6.0 inch to 12.0 inch
Uniform Mass per Unit Length (uniform weight per liner foot)	Field Measured	6 inch = 1.0 lbs/ft minimum 9 inch = 1.5 lbs/ft minimum 12 inch = 2.0 lbs/ft minimum
Length per Tube	Field Measured	6 foot minimum
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Clean Water Flow Rate	ASTM D4491 or Equivalent	100 gal/min/ft ² minimum
Netting Ultraviolet Stability (retained strength after 500 hr)	ASTM D4355	70%

For slope interruption devices for erosion prevention, use non-weighted inlet tubes composed of processed degradable natural material within a synthetic or natural fiber tubular, flexible outer netting. Do not use straw bales, pine bales, leaf mulch, and or grass clippings for slope interruption devices. Ensure that the inner material is long term biodegradable and/or photodegradable.

1.2.6 Type G- Suspended Internal Inlet Filters

Provide Type G suspended inlet filters that exhibit the following properties:

- Have corrosion resistant attachments to facilitate installation and emptying of the Type G inlet filter.
- Have corrosion resistant mechanisms to keep the sides of the Type G inlet filter from touching the catch basin walls.
- Supported by a corrosion resistant rigid frame keeping the inlet filter in suspension without the weight of the grate securing the inlet filter and without any above grade support.
- Have mechanisms to ensure overflow bypass when the filter is full or extreme flow rates are experienced.
- Have a minimum of 2 cubic feet sediment storage capacity.

Provide Type G suspended inlet filters that meet the minimum performance requirements shown in the following table.

Property	Test Method ¹	Value
Filtering Efficiency Performance	ASTM D5141 or ASTM D7351	80% Total Suspended Solids (TSS)
Ultraviolet Stability (Retained strength after 500 hrs)	ASTM D4355	70%
Grab Tensile Strength (MD)	ASTM D4632	250 lbs minimum
Grab Tensile Elongation (MD)	ASTM D4632	25% maximum
Puncture	ASTM D4833	90 lbs minimum
Clean Water Flow Rate	ASTM D4491	100 gal/min/ft ² minimum

¹ Unless otherwise indicated, numerical values represent the Minimum Average Roll Value (MARV).

1.2.7 Quality Assurance

Provide inlet structure filters listed on the most recent edition of *SCDOT Qualified Product List 58* in the appropriate category.

At the time of delivery, provide the RCE with the inlet structure filter packing list containing complete identification, including but not limited to the following:

- Manufacturer name and location,
- Manufacturer telephone number and fax number,
- Manufacturer's e-mail address and web address, and
- Inlet structure filter name, model and/or serial number.
- Certification that the specific inlet structure filter meets the physical and performance criteria of this specification.

1.3 Construction Requirements

1.3.1 Site Preparation

Proper site preparation is essential to ensure that inlet structure filters are in complete contact with the underlying soil or underlying surface. Remove all rocks, clods, vegetation or other obstructions so that installed inlet structure filters have direct contact with the underlying surface.

1.3.2 Installation

Install inlet structure filters in accordance with the manufacturer's written installation instructions, in compliance with these specifications and with all OSHA, local, state, and federal codes and regulations.

1.3.3 Type A- Low Flow Inlet Filters

1.3.3.1 Filter Fabric Inlet Protection

Excavate a trench 6 inches deep around the outside perimeter of the inlet unless the fabric is pneumatically installed. Extend the filter fabric a minimum of 12 inches into the trench. Backfill the trench with soil or crushed stone and compact over the filter fabric unless the fabric is pneumatically installed.

Install steel posts with a minimum post length of 5 feet consisting of standard “T” sections with a weight of 1.25 pounds per foot. Space posts around the perimeter of the inlet on maximum 2-foot centers and drive them into the ground to a depth of 2 feet or to the maximum depth practicable. Ensure the areas for post installation are compacted so the posts are properly installed.

Install the filter fabric to a minimum height of 2 feet above grade. Cut the filter fabric from a continuous roll to the length of the protected area to avoid the use of joints. When joints are necessary, wrap filter fabric together only at a support post with both ends securely fastened to the post, with a minimum 6-inch overlap. Attach fabric to steel posts with heavy-duty plastic ties. Attach a minimum of four evenly spaced ties in a manner to prevent sagging or tearing of the fabric. In all cases, affix ties in no less than four places.

1.3.3.2 Sediment Tube Inlet Protection

Install sediment tubes by laying them flat on the ground. Construct a small trench to a depth that is 20% of the sediment tube diameter. Lay the sediment tube in the trench and compact the upstream sediment tube soil interface. Do not bury sediment tubes. Install all sediment tubes so no gaps exist between the soil and the bottom of the sediment tube. Lap the ends of adjacent sediment tubes a minimum of 6 inches to prevent flow and sediment from passing through the field joint. Never stack sediment tubes on top of one another.

Install sediment tubes using wooden stakes with a minimum stake length of 4 feet and a minimum measured dimension of 3/4 inch x 3/4 inch and a maximum measured dimension of 2 inches x 2 inches, or using steel posts (1.25 lbs/ linear foot) with a minimum post length of 4 feet. Use steel posts without a kick plate and painting is not required. Space posts or stakes on 2-foot centers and drive them into the ground to a depth of 2 feet or to the maximum extent practicable.

Install the stakes or posts on the downstream (1/3) of the sediment tube.

Ensure the areas for stake or post installation are compacted so the stakes and posts are properly installed.

1.3.4 Type B- Medium Flow, Low Velocity Inlet Filters

1.3.4.1 Hardware Fabric and Stone Inlet Protection

Excavate a trench 6 inches deep around the outside perimeter of the inlet.

Use hardware fabric or comparable wire mesh with maximum openings of 0.5 inch by 0.5 inch as the supporting material. Extend the fabric a minimum of 6 inches into the ground. Backfill the trench with soil or crushed stone and compact over the hardware fabric.

Install steel posts with a minimum post length of 4 feet consisting of standard “T” sections with a weight of 1.25 pounds per foot. Space the steel posts a maximum of 2 feet apart around the perimeter of the inlet and drive them into the ground to a minimum depth of 1.5 feet or to the maximum extent practicable.

Install the wire mesh fabric above grade a minimum of 1.5 feet. Use heavy-duty wire ties spaced a maximum of 6 inches apart to attach the wire mesh material to the steel posts. Place Aggregate No. 5 or No. 57 washed stone to a minimum height of 1 foot, and a maximum height of 2 feet against all 4 sides of the hardware fabric.

Ensure the areas for post installation are compacted so the posts are properly installed.

1.3.5 Type D- High Flow, High Velocity Inlet Filters

Install Type D high flow, high velocity inlet filters in accordance with the manufacturer's written installation instructions. Secure Type D inlet filters with No. 5 or No. 57 stone as ballast in lieu of soil when soil is recommended by the manufacturer. Properly install Type D inlet filters so the inlet is completely enclosed.

1.3.6 Type E- Surface Course Curb Inlet Filters

Use Type E surface course inlet filters in conjunction with Catch Basin Types 1, 16, 17 and 18 after the placement of the road surface course. Place surface course inlet filters where sediment may spill over sidewalks and curbs.

Install surface course inlet filters in front of curb inlet openings. Ensure that the maximum height of the Type E surface course filter does not completely block the inlet opening. Install surface course inlet filters that do not have a physical attachment mechanism a minimum length of 2 feet longer than the length of the curb opening to allow sufficient length to cover the inlet with at least 1 foot of clearance beyond the inlet on both ends. Install surface course inlet filters in a manner to allow overflows to enter the catch basin.

When applicable, fill aggregate compartments to a level (at least half full) that keeps the surface course inlet filter in place and creates a seal between the surface course inlet filter and the road surface.

1.3.7 Type F- Inlet Tubes

1.3.7.1 Weighted Inlet Tubes

Weighted inlet tubes do not require posts or additional techniques to keep them in place. Install weighted inlet tubes lying flat on the ground, with no gaps between the underlying surface and the inlet tube. Never stack weighted inlet tubes on top of one another. Do not completely block inlets with weighted inlet tubes. Install weighted inlet tubes in such a manner that all overflow or overtopping water has the ability to enter the inlet being protected. To avoid possible flooding, two or three concrete cinder blocks may be placed between the weighted inlet tubes and the inlet.

All weighted Type F inlet structure filters are applicable as Type E inlet structure filters.

1.3.7.2 Non-Weighted Inlet Tubes

1.3.7.2.1 Inlet Structure Filters

Install non-weighted inlet tubes immediately after grading and construction of Types 1, 16, 17 and 18 catch basin boxes. Maintain non-weighted inlet tubes during subgrade and base preparation until the base course is placed. Review all project specifications for special installation requirements.

Construct a small U-shaped trench to a depth that is 20% of the non-weighted inlet tube diameter. Lay the inlet tube flat in the U-shaped trench and compact the upstream inlet tube soil interface.

Install non-weighted inlet tubes for Types 1, 16, 17 and 18 catch basin boxes using wooden stakes with a minimum length of 3 feet and a minimum measured dimension of 3/4 inch x 3/4 inch and a maximum measured dimension of 2 inches x 2 inches, or 1.25 pounds per foot steel posts with a minimum length of 3 feet. Use steel posts without a kick plate and painting is not required. Space posts or stakes on 2 foot centers and drive them into the ground to a depth of 2 feet or to the maximum extent practicable.

An acceptable alternative installation is driving stakes on each side of non-weighted inlet tubes and connecting them with natural fiber twine or steel wire to inhibit the non-weighted sediment tube from

moving vertically. Another acceptable alternative installation for non-weighted inlet tubes is installing stakes in a crossing manner maintaining direct soil contact at all times.

Install non-weighted inlet tubes so that the top is below the top of the installed curb line to ensure that all overflow or overtopping water has the ability to enter the inlet unobstructed.

1.3.7.2.2 Slope Interruption Devices

Use non-weighted inlet tubes as slope interruption devices for erosion prevention on slopes greater than 50 feet in length for HECF and Temporary Erosion Control Blanket (ECB) slope applications. At the discretion of the RCE, use slope interruption devices on slope lengths less than 50 feet when slope erosion is observed.

For slope interruption devices, use non-weighted inlet tubes composed of only processed degradable natural material within a synthetic or natural fiber tubular, flexible outer netting.

Install non-weighted inlet tubes for slope interruption devices for Hydraulic Erosion Control Products (HECFs) application prior to the HECF installation. Excavate a trench along (parallel) the contour of the slope to a depth that is 1/3 the tube diameter. Place the excavated soil on the up-slope side of the trench. Place the slope interruption device into the trench so it contours to the soil surface, ensuring no gaps exist underneath the tube. Compact the excavated soil against the tube on the up-slope side. Ensure the installation of the slope interruption device does not damage the prepared seedbed.

Install non-weighted inlet tubes slope interruption devices for Temporary Erosion Control Blankets (ECBs) application after the ECB installation on top of the ECB. Tube trenching is not required for ECB applications. Ensure the installation of the slope interruption device does not damage the installed ECB.

Install non-weighted inlet tubes for slope interruption devices using wooden stakes with a minimum length of 3 feet with a minimum measured dimension of 3/4 inch x 3/4 inch and a maximum measured dimension of 1 inches x 1 inches. Do not use steel posts for this application. Install a stake at each end of each tube and space stakes on maximum 4 foot centers. Drive stakes into the ground perpendicular to the slope to a depth of 2 feet or to the maximum extent practicable.

Install the stakes through the center of the non-weighted tube. Abut adjacent tubes tightly, end to end, without overlapping the ends. Tie the tube ends together using heavy twine or plastic locking ties. Dogleg terminal ends of slope interruption devices up slope to ensure containment and the prevention of channeling of runoff.

Ensure the areas for post installation are compacted so the posts are properly installed.

1.3.8 Type G- Suspended Internal Inlet Filters

Install Type G suspended internal inlet filters in accordance with the manufacturer's written installation instructions. Properly install rigid inlet protection so the inlet is completely enclosed.

Type G inlet filters are reusable. Once the construction cycle is complete, remove Type G inlet filter from the basin and clean. Store Type G inlet filters out of the sunlight until needed on another project.

1.3.9 Delivery, Storage, and Handling

Follow the manufacturer's written procedures for inlet structure filter labeling, shipment handling, and storage. Ensure that the manufacturer or supplier name, the structures size, shape, and weight clearly show on product labels.

Store inlet structure filters off the ground and cover adequately to protect them from the following:

- Construction damage,
- Precipitation,
- Extended exposure to ultraviolet radiation including sunlight,
- On-site chemicals,
- Flames including welding sparks,
- Excess temperatures, and
- Other environmental conditions that can damage the physical properties of the inlet filters.

1.3.10 Inspection and Maintenance

- Inspect inlet structure filters after installation for gaps that may permit sediment to enter the storm drainage system.
- Inspect inlet structure filters every 7 days. Correct any damage or needed repairs.
- Remove all accumulated sediment and debris from the surface and vicinity of inlet structure filters after each rain event or as directed by the RCE or manufacturer's representative.
- Remove sediment when it reaches approximately 1/3 the height of each inlet structure filter. If a sump is used, remove sediment when it fills approximately 1/3 the depth of the hole. Maintain the pool area, always providing adequate sediment storage volume for the next storm event.
- Remove, move, and/or replace inlet structure filters as required to adapt to changing construction site conditions.
- Remove inlet structure filters from the site when the functional longevity is exceeded as determined by the RCE or manufacturer's representative.
- Dispose of inlet structure filters no longer in use at an appropriate recycling or solid waste facility.
- Before final stabilization, backfill and repair all trenches, depressions and other ground disturbances caused by the removal of inlet structure filters.
- Remove all construction material and sediment and dispose of them properly. Grade the disturbed areas to the elevation of the inlet structure crest. Stabilize bare areas immediately.

1.3.10.1 Type A- Low Flow Inlet Filters

1.3.10.1.1 Filter Fabric Inlet Protection

Replace the filter fabric if it becomes clogged or as directed by the RCE. Take care not to damage or undercut fabric when removing sediment.

1.3.10.1.2 Sediment Tubes

Inspect sediment tubes after installation for gaps under the sediment tubes and for gaps between the joints of adjacent ends of sediment tubes. Repair rills, gullies and all undercutting near sediment tubes. Remove and/or replace installed sediment tubes as required to adapt to changing construction site conditions. Remove all sediment tubes from the site when the functional longevity is exceeded as determined by the RCE or manufacturer's representative. Dispose of sediment tubes as non-hazardous, inert material.

1.3.10.2 Type B- Medium Flow, Low Velocity Inlet Filters

1.3.10.2.1 Hardware Fabric and Stone Inlet Protection

Clean Type B inlet filters when it becomes covered or clogged with deposited sediment or debris.

If the stones become clogged with sediment, pull the stones away from the inlet and clean or replace the stone. Since cleaning of gravel at a construction site may be difficult, an alternative approach is to remove clogged stone as fill and place fresh stone around the inlet. No separate, measurement or payment will be made for this work.

1.3.10.3 Type D- High Flow, High Velocity Inlet Filters

Remove and/or replace Type D inlet filters as needed to adapt to changing construction site conditions. Clean Type D inlet when it becomes covered or clogged with deposited sediment or debris. When applicable, replace the Type D inlet filter material as directed by the RCE.

1.3.10.4 Type E- Surface Course Curb Inlet Filters

Clean Type E inlet filters when it becomes covered or clogged with deposited sediment or debris. Replace Type E inlet filters as directed by the RCE.

1.3.10.5 Type F- Inlet Tubes

Remove and/or replace Type F inlet tubes as needed to adapt to changing construction site conditions. Replace Type F inlet tubes damaged during installation as directed by the RCE or manufacturer's representative at no cost to the Department.

1.3.10.6 Type G- Suspended Internal Inlet Filters

Inspect Type G inlet filters after installation to ensure no gaps exist that permit sediment to enter the storm drainage system. Immediately handle all damage or necessary repairs. Remove accumulated sediment and debris from Type G inlet filters after each rainfall event or as directed by the RCE or the manufacturer's representative. Remove, move, and/or replace Type G inlet filters as required to adapt to changing site conditions. Remove Type G inlet filters from the site when the functional longevity is exceeded as determined by the RCE or the manufacturer's representative.

1.3.11 Acceptance

Obtain RCE approval of inlet structure filters installations. When requested by the RCE, ensure that a manufacturer's representative is on-site to oversee and approve the installation of inlet structure filters. Obtain a letter from the manufacturer approving the installation when requested by the RCE.

1.4 Measurement

The quantity of the pay item Inlet Structure Filters Type (*B, D1, D2, E CBT-1, E CBT-16, E CBT-17, E CBT-18 or G*) is measured by each (EA) filter furnished and installed, complete, and accepted. The quantity of the pay item Inlet Structure Filters Types (*A, F-Weighted or F-Non-weighted*) is the length of inlet structure filter installed, including overlaps and wastage, and is measured by the linear foot (LF) of filter in-place, complete and accepted. Inlet Structure Filters damaged by the Contractor's operations are not included in the measurement.

The quantity for the pay item Filter Material for Inlet Structure Filter Type D1 or Filter Material for Inlet Structure Filter Type D2 is measured by each (EA) inlet structure filter around which the filter fabric is replaced not due to the fault of the Contractor's operations, complete and accepted. This measurement only includes replacement filter fabric, not the replacement of the frame for the Type D1 or Type D2 inlet structure filter, or for cleaning the Type D1 or Type D2 inlet structure filter.

The quantity of the pay item Cleaning Inlet Structure Filters is measured by each (EA) filter cleaned of deposited sediment from the area adjacent to each inlet structure filter.

1.5 Payment

Payment for Inlet Structure Filters (of the type required) is full compensation for installing the inlet structure filters as specified or directed and includes furnishing, installing, maintaining, inspecting, removing, and disposing of the inlet structure filters; providing posts, fabric, ties, anchor trenches, proper storage facilities, and documentation of Quality Control and Quality Assurance programs; 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, Specifications, and other terms of the Contract.

The initial payment for Type D1 and D2 Inlet Structure Filters includes the rigid structure and initial filter material when applicable.

Payment for Cleaning Inlet Structure Filters is full compensation for removing and disposing of sediment deposits accumulated by each Inlet Structure Filters as specified or directed and includes all material, stone as needed, 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.

Bid Item Number	Description	Units
8156219	Inlet Structure Filter Type A	LF
8156210	Inlet Structure Filter Type B	EA
8156205	Inlet Structure Filter Type D1	EA
8156207	Filter Material for Inlet Structure Filter Type D1	EA
8156215	Inlet Structure Filter Type D2	EA
8156217	Filter Material for Inlet Structure Filter Type D2	EA
8156211	Inlet Structure Filter Type E CBT-1	EA
8156212	Inlet Structure Filter Type E CBT-16	EA
8156213	Inlet Structure Filter Type E CBT-17	EA
8156214	Inlet Structure Filter Type E CBT-18	EA
8152004	Inlet Structure Filter Type F (Weighted)	LF
8152006	Inlet Structure Filter Type F (Non-Weighted)	LF
8156220	Inlet Structure Filter Type G	EA
8154155	Cleaning Inlet Structure Filters	EA