

DESCRIPTION

FINN Filter Sock is a sturdy polypropylene geotextile (woven) that has been engineered specifically for controlling erosion and containing and/or retaining sediment in disturbed areas. It is a mesh tube filled with organic filter material that is placed perpendicular to sheet-flow runoff. The FINN Filter Sock, which is oval to round in cross section, provides a three-dimensional filter that retains sediment and other pollutants (e.g., suspended solids, nutrients, and motor oil) while allowing the cleaned water to flow through. The FINN Filter Sock can be used in place of traditional sediment and erosion control tools such as a silt fence or straw bale barrier.

FINN Filter Socks are generally placed along the perimeter of a site, or at intervals along a slope, to capture and treat stormwater that runs off as sheet flow. FINN Filter Socks are flexible and can be filled in place or filled and moved into position, making them especially useful on steep or rocky slopes where installation of other erosion control tools is not feasible. There is greater surface area contact with soil than typical sediment control devices, thereby reducing the potential for runoff to create rills under the device and/or create channels carrying unfiltered sediment.

Additionally, they can be laid adjacent to each other, perpendicular to stormwater flow, to reduce flow velocity and soil erosion. FINN Filter Socks can also be used on pavement as inlet protection for storm drains and to slow water flow in small ditches. FINN Filter Socks are 8,9,12, 18 and 24 inches in diameter. Organic cotton, biodegradable FINN Filter Socks are available for required applications.

FINN Filter Socks can be unvegetated or vegetated. Vegetated FINN Filter Socks can be left in place to provide long-term filtration of stormwater as a post-construction best management practice (BMP). The vegetation grows into the slope, further anchoring the FINN Filter Sock. Unvegetated FINN Filter Socks are often cut open when the project is completed, and the organic filter material is spread around the site as a soil amendment or mulch. The FINN Filter Sock mesh fabric is then disposed of unless it is biodegradable. Advantages the FINN Filter Sock has over traditional sediment control tools, such as a silt fence, are:

- Installation does not require disturbing the soil surface, which reduces erosion.
- It is easily removed.
- It can be installed on frozen or rocky surfaces where trenching is not viable.
- The operator must dispose of only a relatively small volume of material (the mesh).

APPLICABILITY

FINN Filter Socks are applicable to construction sites or other disturbed areas where stormwater runoff occurs as sheet flow. Common industry practice for filter devices is that drainage areas do not exceed 0.25 acre per 100 feet of device length and flow does not exceed one cubic foot per second (see Siting and Design Considerations). FINN Filter Socks can be used on steeper slopes with faster flows if they are spaced more closely, stacked beside and/or on top of each other, made in larger diameters, or used in combination with other stormwater BMPs.

SITING AND DESIGN CONSIDERATIONS

Materials: Several types of materials can be utilized for filter material in the FINN Filter Sock. The key to achieving the proper balance between sediment removal and flow-through rate is using a material with the proper particle size. Filter material with a high percentage of fine particles will clog and create a barrier to flow. Alternatively, filter material with particles that are too large will allow flows to pass through the barrier with little or no resistance, eliminating the velocity reduction and sediment trapping benefits of the barrier. Filter material normally consists of a wood chips or mulch that is screened to remove some of the fines and produce the desired gradation.

Design: FINN Filter Socks are round to oval in cross section; they are assembled by tying a knot or zip tie at one end of the mesh, filling the FINN Filter Sock with the organic filter material (usually using a pneumatic blower or auger fill system), then knotting or zip tying the other end once the desired length is reached. An FINN Filter Sock the length of the slope is normally used to ensure that stormwater does not break through at the intersection of FINN Filter Socks placed end-to-end. In cases where this is not possible, the FINN Filter Socks are placed end-to-end along a slope and the ends are interlocked. The diameter of the FINN Filter Sock used will vary depending upon the steepness and length of the slope; example slopes and slope lengths used with different diameter FINN Filter Socks are presented in Table 2.

Siting: Although FINN Filter Socks are usually placed along a contour perpendicular to sheet flow, in areas of concentrated flow they are sometimes placed in an inverted V going up the slope, to reduce the velocity of water running down the slope. The project engineer may also consider placing FINN Filter Socks at the top and base of the slope or placing a series of FINN Filter Socks every 15 to 25 feet along the vertical profile of the slope. These slope interruption devices slow down sheet flow on a slope or in a watershed. Larger diameter FINN Filter Socks are recommended for areas prone to high rainfall or sites with severe grades or long slopes.

Table 1 Example of FINN Filter Sock Filtering Parameters

PARAMETERS	UNITS OF MEASURE	UNVEGETATED FINN FILTER SOCK
Particle Size	% passing a selected mesh size dry weight basis	>0.53 mm 100% passing <0.53 mm 54-91% passing

Table 2 Example of Slope Length & FINN Filter Sock Diameters

SLOPE	SLOPE LENGTH	DIAMETER
<50:1	250	9
50:1 - 10:1	125	9
10:1 - 5:1	100	12
3:1 - 2:1	50	18
>2:1	25	18-24

LIMITATIONS

FINN Filter Sock offers a large degree of flexibility for various applications. To ensure optimum performance, heavy vegetation should be cut down or removed, and extremely uneven surfaces should be leveled to ensure that the FINN Filter Sock uniformly contacts the ground surface. FINN Filter Socks installed perpendicular to flow in areas where a large volume of stormwater runoff is likely, but should not be installed perpendicular to flow in perennial waterways and large streams.

MAINTENANCE CONSIDERATIONS

FINN Filter Socks should be inspected regularly, as well as after each rain event, to ensure that they are intact and the area behind the FINN Filter Sock is not filled with sediment. If there is excessive ponding behind the FINN Filter Sock or accumulated sediment reaches the top of the FINN Filter Sock, an additional FINN Filter Sock should be added on top or in front of the existing FINN Filter Sock in these areas, without disturbing the soil or accumulated sediment. If the FINN Filter Sock was overtopped during a storm event, the operator should consider installing additional FINN Filter Sock on top of the original, placing an additional FINN Filter Sock up the slope, or using an additional BMP such hydroseeding, matting/netting or compost blankets in conjunction with the FINN Filter Sock.

EFFECTIVENESS

A large number of qualitative studies have reported the effectiveness of filter tube devices in removing settleable solids, total suspended solids and turbidity reduction from sediment laden water, (see Dr. Amanda Cox, Colorado State University, 2011). These studies have consistently shown that filter tubes devices, i.e. FINN Filter Sock, are at least as effective as traditional erosion and sediment control BMP's and often are more effective. FINN Filter Socks are often used in conjunction with hydroseeding, matting/netting, or compost blankets to form a stormwater management system. Together these BMPs retain a very high volume of stormwater, sediment and other pollutants.

INSTALLATION

No trenching is required; therefore, soil is not disturbed upon installation. Once the FINN Filter Sock is filled and put in place, it should be anchored to the slope. The preferred anchoring method is to drive stakes through the center of the tube at regular intervals; alternatively, stakes can be placed on the downstream side of the FINN Filter Sock. Stakes should be wooden 2 inch by 2 inch by 3 ft. The spacing of the stakes should be equal distance across the length of the FINN Filter Sock. For perimeter sediment control stakes should be placed 5 ft. apart. For ditch checks stakes should be placed 3 ft. apart. The ends of the FINN Filter Sock should be directed upslope to prevent stormwater from running around the end of the FINN Filter Sock. The FINN Filter Sock may be vegetated by incorporating seed into a compost fill material prior to placement in the FINN Filter Sock. Since the FINN Filter Socks do not have to be trenched into the ground, they can be installed on frozen ground or even cement.

