US Army Corps of Engineers
Engineer Research and Development Center

Filter Socks Technology
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How Filter Socks Work

Filter Sock Construction Procedure:
- Inspect area, locate and mark utilities
- Select site for filter sock
- Check and acquire appropriate permits
- Install filter sock materials as per construction specification

Filter socks are an Low Impact Development (LID) tool typically used during the construction phase of the construction process to facilitate streambank stabilization and to act as temporary filters to protect inlets to stormdrains and provide perimeter controls. They are three-dimensional tubular devices used to trap the physical, chemical, and biological pollutants in stormwater. Once installed, they also create a temporary ponding area behind the sock, which facilitates the deposition of suspended solids.
Filter socks are able to be rapidly installed on a construction site area to protect water quality downstream.
They may be usually used in conjunction with other, more technologically complex and permanent LID tools. If runover or damaged, they are easily repaired.
Appropriate for slopes up to 2:1 (1:1 if used in conjunction with slope stabilization/erosion control technology on slopes > 4:1)
Appropriate for high flow areas.
May be used to provide erosion and sediment control in areas that are appropriate for silt fence.
Organic matter in filter socks binds phosphorus, metals, and hydrocarbons that may be in stormwater. The sock may also be directed seeded and left in place as a permanent vegetative feature. If not left in place, it may be incorporated as a soil amendment once construction activity is complete.
The filter media is adjustable to meet specific filtering performance needs as determined by the Engineer or Landscape Architect in charge of the project.

Construction Materials Needed

Required construction materials are:

1. *Handtools:* Shovels, picks, hoses, wheelbarrows.
2. *Marking Materials:* Flagging, flags, or spray paint to delineate area.
3. *Compost:* Use only mature compost that has been certified by the U.S. Composting Council's Seal of Testing Assurance Program (www.compostingcouncil.org), and meets the following specifications:

Factor	Acceptable Range
pH	5.0–8.5
Moisture Content	< 60%
Organic Matter	> 25%, dry weight
Particle size	99 % passing 2-in. sieve 30 – 50% passing 3/8-in. sieve
Physical contaminants	< 1%, dry weight

4. *Filter sock netting:* 5mm thick continuous HDPE filament, tubular knitted mesh with 3/8-in. openings. Use biodegradable plastic if filter sock will not be removed after construction. Use 12-in. diameter netting for most applications. In very high flow areas, use 18-in. diameter netting.
5. *Stakes:* Use 2x2-in. wooden stakes.

Installation Procedure

To install:

1. Locate/Mark any utilities.
2. Check all permits.
3. Obtain compost meeting specifications.
4. Obtain filter sock netting.
5. Fill filter sock netting with compost.
6. Mark out area for filter sock; orient length of sock parallel to the slope so that the runoff enters as sheet flow.
7. In high-flow or steep-slope areas, orient a second sock parallel to the first to dissipate flows.
8. Lay filter sock netting out as planned.
9. Fill filter sock with compost.
10. Stake filter sock every 10 ft. Stakes should be driven through the center of the sock, and 1 ft into the ground.
11. If sock netting must be joined, fit beginning of the new sock over the end of the old sock, overlapping by 1–2 ft. Fill with compost; then stake the join.

Typical Maintenance Schedule

Inspect filter socks periodically, and especially after large storm events. Ensure that the filter sock is intact, and that the area upstream has not filled with sediment. If the upstream area has filled with sediment, or if the filter sock has been overtopped, install additional filter socks further upstream. Sediment behind the sock should be removed when the depth of the sediment reaches 3.25-in. for an 8-in. sock, 4.75-in. for a 12-in. sock and 7.25-in. for an 18-in. sock. For socks with greater diameters, remove sediment behind the sock when the accumulated sediment depth reaches 40 percent of the design diameter of the sock.

Regional Considerations

Climate concerns will vary with each locality. Filter socks are more or less effective depending on a variety of climatic factors, primarily temperature and moisture regimes.
See also: Climate Chart in Appendix E1

Potential Limitations

Certain site conditions may limit the appropriateness of filter socks. In very uneven terrain, the area where the filter sock will rest should be leveled to ensure good contact between the sock and the ground.
Compost filter socks are applicable where stormwater runoff occurs as sheet flow.
Drainage areas should not exceed 0.25 acre per 100 ft of device length.
Flow should not exceed 1 cu ft/second.
If compost filter socks are to be used on steeper slopes with faster flows, they must be spaced more closely, stacked beside and/or on top of each other, made in larger diameters, or used in combination with other stormwater BMPs such as compost blankets.

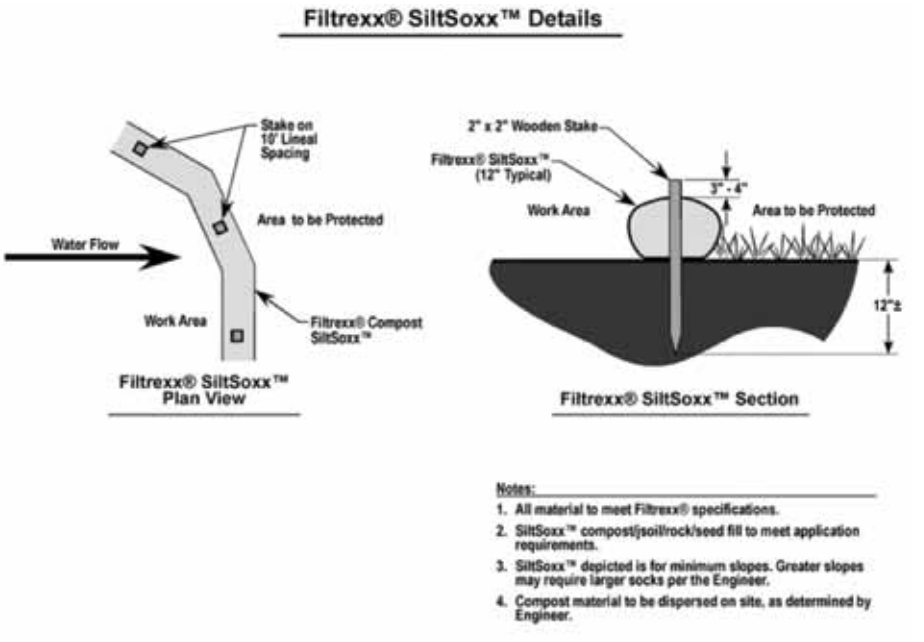
Effectiveness of Filter Socks

Runoff Volume Reduction. Compost filter socks slow the rate of stormwater runoff, reducing peak flows. They do not provide storage. Compost filter socks are easily installed, with low life-cycle costs and offer high levels of durability and sediment control, medium levels of soluble pollutant and runoff volume control. They are approved for American Association of State Highway and Transportation Officials (AASHTO) & USEPA National Pollutant Discharge Elimination System (NPDES) Phase II. Installation of filter socks does not require trenching or further site disruption and may be installed year round including on frozen ground and on dense and compacted soils as long as stakes can be driven.

Pollutant Removal Effectiveness

Pollutant	Reported Removal Rate
Sediment (TSS)	97–99%
Motor Oil Removal	96%
Phosphorus	34–99%*
Nitrate	25%
Sources: Faucette et al. 2005; Filtrexx 2007. *depending on formulation of filter media	

Typical Construction Details of Filter Sock Installation



Engineering Design Drawing for SiltSoxx™*

References

Alexander, R. 2006. Filter berms and filter socks: standard specifications for compost for erosion/sediment control. Apex, NC: R. Alexander Associates, http://www.alexassoc.net/composting_recycling_articles.htm

Faucette, et al. 2005. Evaluation of stormwater from compost and conventional erosion control practices in construction activities, *Journal of Soil and Water Conservation,* 60(6):288-297.

Filtrexx. 2007. Standard specifications and design manual –version 6, updated 5-1-07. Section 1: Erosion and sediment control-construction activities 1.1 Filtrexx SiltSoxx™ sediment & perimeter control technology, http://www.filtrexx.com/

U.S. Environmental Protection Agency, National Pollutant Discharge Elimination System (NPDES): Compost filter socks. Accessed June 2007,

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* Filtrexx, 2007. Standard Specifications and Design Manual –Version 6, updated 5-1-07. Section 1: Erosion and Sediment Control-Construction Activities 1.1 Filtrexx SiltSoxx™ Sediment & Perimeter Control Technology. pdf

http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm?action=browse&Rbutton=detail&bmp=120