

## 1.3 Check Dams - Compost Filter Sock

### PURPOSE & DESCRIPTION

**Filtrex SiltSoxx® (Soxx) compost filter sock** is a three-dimensional tubular sediment control and stormwater runoff filtration device typically used for **Check Dams**, as stormwater drainage ditches and small channels on or near land disturbing activities to:

- slow concentrated directional flow velocity of storm runoff,
- reduce gully erosion in ditch bottoms,
- remove sediment and soluble pollutants (such as phosphorus and petroleum hydrocarbons) present in stormwater runoff

Check dams provide a porous physical barrier perpendicular to concentrated stormwater flow designed to reduce and disperse runoff energy. It reduces erosion by slowing runoff velocity and dissipating concentrated storm runoff flow. It also traps sediment and soluble pollutants primarily by *filtering* stormwater as it passes through the matrix of the check dam *and* secondarily by allowing water to temporarily pond behind the check dam, allowing *deposition* of suspended solids.

### APPLICATION

Check dams are used in drainage ditches and small channels on and around land disturbing activities until final stabilization is complete. Check dams should be installed prior to excavating, filling, or grading of uphill areas. Check dams are only used in ditch grades equal to or less than 10% (grades greater than 10% should employ structural stabilization practices). Check dams should not be used in areas where the contributing drainage area is greater than 2 (Fifield, 2001) to 10 acres (KY TC, 2006) (0.8 ha to 4 ha), and should be placed in a manner to prevent sediment from entering receiving streams, rivers, lakes, or wetlands. Check dams should never be used in ephemeral, perennial, or intermittent streams.

### ADVANTAGES AND DISADVANTAGES

#### Advantages

- Tubular filtration matrix allows for better trapping and removal of sediment and soluble pollutants in stormwater compared to planar constructed sediment control devices.
- Check dams can be customized to remove target pollutants from stormwater, such as phosphorus and turbidity.
- Porous physical barrier of check dams reduces stormwater flow velocity and disperses runoff energy.
- Correct spacing of check dams will reduce erosion and prevent gully formation in ditch/channel bed.
- Greater surface area contact with soil relative to planar geotextile devices used for check dams reduces potential for runoff to undercut the device leading to unfiltered stormwater.
- No trenching is required; therefore soil is not disturbed upon installation.
- Check dams can be installed year around in difficult soil conditions such as frozen or wet ground, and dense and compacted soils, as long as stakes can be driven.
- Check dams can be easily installed on top of rolled erosion control blankets and turf reinforcement mats.
- Check dams are easily implemented as one treatment in a greater treatment train approach to a site erosion and sediment control system.
- Organic matter and humus colloids in FilterMedia™ have the ability to bind and adsorb phosphorus, metals, and hydrocarbons that may be present in stormwater runoff.

- Microorganisms in compost FilterMedia™ have the ability to degrade organic pollutants and cycle captured nutrients in stormwater runoff.
- Soxx (mesh netting containment system) allows check dams to be placed in areas of concentrated flow.
- Check dams can be direct seeded at time of application to provide greater stability and pollutant filtration capability once vegetation has established.
- FilterMedia is organic and can be left on site soil after permanent stabilization is complete, used in landscape design, and/or seeded and planted with permanent vegetation.
- FilterMedia improves existing soil structure if spread out and used as a soil amendment after construction activity is complete.
- Biodegradable check dams can be left on site after construction activity is complete and may eliminate the need and cost for removal, labor and disposal.
- Check dams are available in 8 in (200mm), 12 in (300mm), 18 in (450mm), 24in (600mm), and 32 in (800mm) diameters for a variety of flow conditions and/or customized applications.
- Check dams may assist in qualification for LEED® Green Building Rating and Certification credits under LEED Building Design & Construction (BD+C), New Construction v4. Awarded credits may be possible from the categories of Sustainable Sites, Water Efficiency, Materials & Resources, and Innovation. *Note: LEED is an independent program offered through the U.S. Green Building Council. LEED credits are determined on a per project basis by an independent auditing committee. Filtrex neither guarantees nor assures LEED credits from the use of its products. LEED is a trademark of the U.S. Green Building Council.*

#### Disadvantages

- If filler material of check dams is not Filtrex® Certified<sup>SM</sup> FilterMedia, hydraulic flow rate and/or sediment and pollutant removal performance may be diminished.
- If not installed correctly, maintained or used for a purpose or intention that does not meet specifications, performance may be diminished.
- If land surface is extremely bumpy, rocky, or changes elevation abruptly, ground surface contact to check dam may be diminished thereby adversely effecting performance.
- If stormwater flow breaches check dam sediment retention will be diminished.
- Check dams should never be the only form of site erosion/

sediment control.

ADVANTAGES			
	LOW	MED	HIGH
<b>Installation Difficulty</b>	✓		
<b>Durability</b>			✓
<b>Sediment Control</b>			✓
<b>Runoff Flow Control</b>		✓	
<b>Life Cycle Cost</b>	✓		

- No ditch checks should be used in drainage areas that exceed 10 acres (4 ha).
- No ditch checks should be used in drainage ditches/channels that exceed a 10% slope.
- Check dams should not be placed in ephemeral, perennial, or intermittent streams.

#### MATERIAL SPECIFICATIONS

Check dams use only Soxx photodegradable or biodegradable netting materials available from Filtrexx International and are the only mesh materials accepted in creating check dams for any application. For Soxx Material Specifications see Table 3.1.

#### FILTERMEDIA™ CHARACTERISTICS

Check dams use only Filtrexx Certified<sup>SM</sup> FilterMedia which is a coarse composted material that is specifically designed for removal of solids and soluble pollutants from stormwater runoff. *FilterMedia can be altered or customized to target specific pollutants in runoff as approved by the Engineer or Filtrexx International.* All Filtrexx Certified FilterMedia has been third party tested and certified to meet minimum performance criteria defined by Filtrexx International. Performance parameters include hydraulic flow through rate, total solids removal efficiency, total suspended solids removal efficiency, turbidity reduction, nutrient removal efficiency, metals removal efficiency, and motor oil removal efficiency. For information on the physical and chemical properties of Certified FilterMedia refer to the Filtrexx Design Manual, Section 5.1. Look for the Filtrexx Certified FilterMedia Seal from our international network of Filtrexx Certified Installers and Manufacturers.

#### PERFORMANCE

Performance testing and research on sediment control has been extensive. For a summary of performance testing, research results, and design specifications see Table 3.2. For copies of publications, full reports, or Tech Link summaries visit [www.filtrexx.com](http://www.filtrexx.com). Successful bidders will furnish adequate research support showing their manufactured product meets or exceeds performance and design criteria outlined in this standard specification. Research or performance testing will be accepted if it meets the following criteria: conducted by a neutral third party, utilizes standard test methods reported by ASTM or referenced in a peer reviewed scientific journal, product and control treatments are tested in triplicate, performance results are reported for product and control (control should be a bare soil under the same set of environmental and experimental conditions), results are peer reviewed, results indicate a minimum 60% TSS removal efficiency and a minimum hydraulic flow through rate of 5 gpm/ft<sup>2</sup>. Bidders shall attach a copy of the research report indicating test methodologies utilized and results.

*Note: the Contractor is responsible for establishing a working erosion and sediment control system and may, with approval of the Engineer, work outside the minimum construction requirements as needed. Where the Check dam deteriorates or fails, it shall be repaired or replaced with an effective alternative.*

#### DESIGN CRITERIA

Check dams are used as dams in drainage ditches and small channels to reduce velocity of concentrated storm runoff, reduce soil erosion and gully formation in drainage ditches/channel beds, and reduce sediment and pollutant loads flowing through and exiting drainage ditches/channels.

For engineering design details of check dams see Figure 3.1, 3.2, and 3.3. For spacing and height specifications see Figure 3.4. For a summary of specifications for product/practice use, performance and design see Table 3.1 and Table 3.2.

#### Planning:

Check dam application using check dams should not be considered as the primary/only means of sediment control and should be used within an overall integrated Erosion and Sediment Control or Storm Water Pollution Prevention Plan. Check dams should be considered one of the last treatments in a 'treatment train system' before stormwater is discharged *from* a site or *to* a receiving water or wetland.

Preconstruction meetings should be conducted to educate construction site personnel about the tools/practices used and acceptable traffic patterns that avoid running over check dams with heavy equipment.

#### Device Function:

Check dams are a *porous physical barrier* that is specifically designed to slow stormwater flow velocity without completely stopping, or ponding water. This reduces the propensity for flooding and runoff undercutting the device. Check dams also remove sediment and soluble pollutants from stormwater. The sediment and pollutant removal process characteristic to check dams combines both filtering and deposition of solids from ponding. This is different than methods that rely solely on ponding for deposition of solids for sediment control. Ponding occurs when water flowing to the check dam accumulates faster than the hydraulic flow through rate of the check dam (and pollutant loads in stormwater are generally greater). Typically, hydraulic flow-through rates for check dams is **50% greater** than geotextile filter fabric (silt fence). *Greater hydraulic flow-through rates reduce ponding, therefore reducing the need for taller sediment control structural design height.* However, installation and maintenance is especially important for proper function and performance.

#### Pollutant Removal:

Unlike most check dam devices which only remove large sediment solids and some suspended solids, check dams have been shown to remove stormwater pollutants that are more challenging. Check dams have the ability to remove soluble pollutants, such as phosphorus and petroleum hydrocarbons (e.g. motor oil), from stormwater runoff. Additional Filtrexx Support Practices can be added to the check dams to increase removal efficiency of target pollutants such as turbidity, TSS, and soluble phosphorus (see Section 4.1 EnviroSoxx® Pollutant Removal).

It should be noted that sediment removal efficiency can be near 100% unless runoff breaches the check dam, at which point the effectiveness may be reduced.

#### Runoff Flow:

Stormwater overflow of check dams is acceptable, since slowing stormwater flow velocity is the principle objective for check dam applications. Larger diameter check dams should be constructed if high runoff depth and flow rates are anticipated. Check dams should be specified and installed so that the center height of the device is at least 6 in (150mm) lower than the banks of the ditch or channel. Additionally, the ends of the check dam should extend up the banks so that stormwater moves through and over the check

dam and not around the ends. In extremely high flow channels, channel protection, rip rap, or turf reinforcement mats should be considered to prevent extreme channel soil erosion and help slow potentially destructive stormwater flows. Runoff reduction design and practices, such as Low Impact Development, should also be considered to reduce runoff flows draining to, and through ditches and channels.

#### Orientation:

Place check dams on contours and even surfaces to assist in dissipating concentrated flow into sheet flow and prevent undercutting of device. Concentrated flow of water should be perpendicular to the check dam at impact.

#### Sediment Accumulation:

Sediment and debris behind check dams should be removed once the accumulated height reaches  $\frac{1}{2}$  the height of the check dam. Alternatively, another check dam can be installed slightly upslope, on top of the existing check dam, thereby increasing capacity. This process does not qualify as a soil disturbing activity. Storm debris accumulation behind the check dam should never reach a height equal to the ends of the check dam or the banks of the ditch or channel.

#### Vegetated Check Dams:

For permanent check dam applications check dams can be direct-seeded at the time of installation to allow vegetation to establish directly in the check dam. Vegetated check dams will further assist in slowing runoff velocity which can increase deposition and filtration of pollutants, and reduce the erosivity of stormwater runoff. The option of adding vegetation will be at the discretion of the Engineer. No additional soil amendments or fertilizer is required for vegetation establishment in the check dam. The appropriate seed mix shall be determined by the Engineer.

#### Drainage Area and Spacing:

Spacing and design height of check dams is ultimately dependent on the slope of the ditch or channel. See Figure 3.4 for spacing requirements. Check dam spacing may be reduced to further slow storm flow velocity, decrease propensity for bed erosion, and/or increase sediment and pollutant removal rates. *Spacing check dams closer together will reduce flow velocity and bed erosion, while higher check dams will remove more sediment from storm flows.*

For drainage ditches/channels with low concentrated flow velocity ( $\leq 6$  CFS,  $\leq 0.17$  CMS) and very small drainage areas a 12 in (300mm) diameter check dam is recommended. For drainage ditches/channels where concentrated flow velocity is moderate (6-10 CFS, 0.17-0.28 CMS) a 18 in (450mm) check dam is recommended; for a drainage area larger than 1 acre (0.4 ha), or area draining to the ditch/channel is subject to high soil erosion and sediment transport a 24 in (600mm) Inlet protection is recommended. *Check dams may be stacked in a pyramid or equilateral triangle construction, if additional design height is required.* See Figure 3.2 for design drawing details.

#### Design Options:

Closely spaced check dams intended as storm flow 'speed bumps' can be specified using 8 in (200mm) diameter check dams. This practice is used specifically to slow storm flow velocity and reduce ditch/channel bed erosion.

As an alternative to placing the check dam across the ditch or channel, the check dam may be installed in a "Λ" construction where the apex (or angle) of the "Λ" is positioned in the center of the ditch/channel bed pointing in the up-channel direction with the open end facing down-channel. The inside construction angle shall be 90 degrees. The ends of the check dam should extend to the interface of the ditch/channel bed and bank or up to the maximum flow line of the ditch/channel. Ends of the check dam should be stabilized with stakes. Positioning the check dam in this manner will act to slow and dissipate the energy of concentrated storm flows in the ditch/channel by disrupting and spreading concentrated storm flows within the ditch/channel bed. It should be noted that this design construction will function less for sediment control than the conventional design construction. See Figure 3.3 for design drawing details.

#### INSTALLATION

1. Check dams used for slowing runoff velocity in storm ditches and channels and used to reduce sediment and soluble pollutant loads leaving ditches and channels shall meet Filtrexx Soxx Mesh Material and Filtrexx Certified FilterMedia specifications.
2. Call Filtrexx at 877-542-7699 or visit [www.filtrexx.com](http://www.filtrexx.com) for a current list of installers and distributors of Filtrexx products.
3. Check dams shall be placed at locations indicated on plans and in a manner as directed/specified by the Engineer or Manufacturer. Check dams should be installed in a pattern that reduces runoff velocity and ditch erosion, and allows for deposition of sediment and filtration of pollutants.
4. Check dams may be manufactured on-site at time of application or pre-manufactured and delivered to site for installation.
5. Installation of check dams will ensure that the check dams exceed the width of the normal ditch/channel flow line by at least 4 ft (1.2m) on both banks to ensure water flows through and over the device and not around it.
6. Center of check dams shall be at least 6 in (150mm) lower than the sides of the ditch/channel.
7. Standard diameter size of Check dams for normal protection is 12 in (300mm). In high flow ditches/channels, the designer may specify larger Check dams of 18 in (450mm) or 24 in (600mm) diameter, or increase staking requirement.
8. Check dams may be stacked on top of each other, if additional height is required.
9. 8 in (200mm) diameter check dams may be placed closer together to act as 'speed bumps' to slow flow velocity and reduce ditch/channel bed erosion.
10. If check dams are specified as a "Λ" construction design, the angle of the ditch protection must be configured to a 90 degree angle with the apex of the device in the center of the ditch/channel bed with the open end facing down-channel. Ends of check dams shall extend to the bed and bank interface or to the maximum flow line of the ditch/channel. Stakes shall be used to stabilize the ends of the check dam.
11. Stakes shall be installed through the middle of the check dam on 5 ft (1.5m) centers, using 2 in (50mm) by 2 in (50mm) by 3 ft (1m) wooden stakes.
12. Staking depth for sand and silt loam soils shall be 12 in (300mm), and 8 in (200mm) for clay soils.
13. Vegetated Check dams may be seeded at the time of manufacture and installation to create a contained 'green or living bio-filter/vegetated filter'. These may be left intact once construction phase is complete. The appropriate seed mix shall be specified by the Engineer.



14. Check dams may be installed on top of rolled erosion control blankets and turf reinforcement mats.

#### INSPECTION

Routine inspection should be conducted within 24 hrs of a runoff event or as designated by the regulating authority. Check dams should be regularly inspected to make sure they maintain their shape and are producing adequate hydraulic flow-through, ditch/channel erosion control, and sediment removal. If ponding becomes excessive, additional check dams may be required or sediment removal may be necessary. Sediment accumulation should be removed once it reaches  $\frac{1}{2}$  the height of the check dam. Alternatively, another check dam may be installed slightly upslope, on top of the existing one. This process is not considered a soil disturbing activity. Storm debris accumulation behind check dams should never be higher than the sides of the check dam. Storm runoff overflow is acceptable during large events. Check dams shall be inspected until drainage area above and/or around receiving ditch/channel has been permanently stabilized and construction activity has ceased.

#### MAINTENANCE

1. The Contractor shall maintain the ditch protection in a functional condition at all times and it shall be routinely inspected.
2. If the check dam has been damaged, it shall be repaired, or replaced if beyond repair.
3. The Contractor shall remove sediment at the base of the upslope side of the check dam when accumulation has reached  $\frac{1}{2}$  of the effective height of the check dam, or as directed by the Engineer. As an alternative, another ditch protection may be installed adjacent and parallel to the upslope side of the original to increase sediment storage capacity with soil disturbance. Check dam and sediment backup in the center of the ditch/channel should always remain lower than the sides.

#### FIELD APPLICATION PHOTO REFERENCES



Use as Speed Bumps to Slow Storm Water Velocity

#### ADDITIONAL INFORMATION

For other references on this topic, including additional research reports and trade magazine and press coverage, visit the Filtrexx website at [filtrexx.com](http://filtrexx.com)

Filtrexx International, Technical Support  
877-542-7699 | [www.filtrexx.com](http://www.filtrexx.com) | [info@filtrexx.com](mailto:info@filtrexx.com)  
Call for complete list of international installers and distributors.

the branch & leaf logo®, EnviroSoxx®, Filtrexx®, Filtrexx SiltSoxx®, GreenLoxx®, GroSoxx®, and the color GREEN®, are Registered

4. If check dams become clogged with debris and sediment, immediate removal of debris and sediment should be conducted to assure proper drainage and water flow through the ditch or channel. Storm runoff overflow of the check dam is acceptable.
5. Check dams shall be maintained until disturbed area around the device has been permanently stabilized and construction activity has ceased.
6. The FilterMedia may be dispersed on site once disturbed area has been permanently stabilized, construction activity has ceased, or as determined by the Engineer.

#### DISPOSAL/RECYCLING

FilterMedia is an organic, composted product manufactured from locally generated organic, natural, and biologically based materials. Once all soil has been stabilized and construction activity has been completed, the FilterMedia may be dispersed with a loader, rake, bulldozer or similar device and may be incorporated into the soil as an amendment or left on the soil surface to aid in permanent seeding or landscaping. Leaving the FilterMedia on site reduces removal and disposal costs compared to other sediment control devices. The mesh netting material will be extracted from the FilterMedia and disposed of properly by the Contractor. The photodegradable mesh netting material (Soxx) may degrade if left on site. Biodegradable mesh netting material is available and may eliminate the need and cost of removal and disposal.

#### METHOD OF MEASUREMENT

Bid items shall show measurement as 'X inch (X mm) diameter Filtrexx® Check Dams/SiltSoxx/DitchChexx™ per linear ft (linear meter) installed, per check dam, or as specified by the Engineer.

Engineer shall notify Filtrexx of location, description, and details of project prior to the bidding process so that Filtrexx can provide design aid and technical support.



Check dams can be used to minimize transport and retain

Trademarks used by Filtrexx International.

CECB™ [Compost Erosion Control Blanket], CSWB™ [Compost StormWater Blanket], DitchChexx™, EdgeSaver™, FilterCell™, FilterMedia™, FilterSoxx™, GrowingMedia™, InletSoxx™, LivingWall™, and Lockdown™, are Trademarks used by Filtrexx International.

Filtrexx Certified<sup>SM</sup> and its accompanying logo are Service Marks used by Filtrexx International.

The information contained herein may be subject to confidential intellectual property of Filtrexx International, including but not limited to US Patents 7,226,240; 7,452,165; 7,654,292; 8,272,812; 8,439,607; 8,740,503; 8,821,076; 9,044,795; 9,945,090; and 9,982,409 or Patents Pending and is the property of Filtrexx International.

Copyright 2005-2021, Filtrexx International, all rights reserved. Unauthorized reproduction prohibited. All statements, product characteristics, and performance data contained herein are believed to be reliable based on observation and testing, but no representations, guarantees, or warranties of any kind are made as to accuracy, suitability for particular applications, or the results to be obtained. Nothing contained herein is to be considered to be permission or a recommendation to use any proprietary process or technology without permission of the owner. No warranty of any kind, expressed or implied, is made or intended.

#### REFERENCES CITED & ADDITIONAL RESOURCES

Faucette, L.B., K. Kerchner, and A. Vick. 2006. Sediment Storage Capacity of SiltSoxx™ vs. Silt Fence. Filtrexx® Tech Link #3314

Faucette, L.B., H. Keener, M. Klingman, and K. Kerchner. 2006. Design Capacity Prediction Tool for Silt Soxx™ and Silt Fence. Filtrexx® Tech Link #3313 (description) and Filtrexx® Library #301 (design tool)

Faucette, L.B., and A. Vick. 2006. LEED Green Building Credits using Filtrexx® Organic BMPs. Filtrexx® Tech Link #3301

Faucette, L.B., A. Vick, K. Kerchner. 2006. Filtrexx®, Compost, Low Impact Development (LID), and Design Considerations for Storm Water Management. Filtrexx® Tech Link #3306

Faucette, L.B. 2006. Flow-Through Rate, Design Height, and Design Capacity of Silt Soxx™ and Silt Fence. Filtrexx® Tech Link #3304

Faucette, L.B. 2006. Design Height, Flow-Through Rate, and Slope Spacing of SiltSoxx™ and Silt Fence. Filtrexx® Tech Link #3311

Faucette, L.B., and R. Tyler. 2006. Organic BMPs used for Storm Water Management. Proceedings of the International Erosion Control Association Annual Conference, Long Beach, CA 2006.

Faucette, B., Sadeghi, and A., K. Sefton. 2006. USDA ARS - Evaluation of Compost Filter Socks and Silt Fence in Sediment and Nutrient Reduction from Runoff. Filtrexx® Tech Link #3308

Faucette, B, F. Shields, and K. Kurtz. 2006. Removing storm water pollutants and determining relations between hydraulic flow-through rates, pollutant removal efficiency, and physical characteristics of compost filter media. Second Interagency Conference on Research in Watersheds, 2006 Proceedings. Coweeta Hydrologic Research Station, NC. Filtrexx® Library #106.

Faucette L.B., C.F. Jordan, L.M. Risse, M. Cabrera, D.C. Coleman, and L.T. West. 2005. Evaluation of Storm Water from Compost and Conventional Erosion Control Practices in Construction Activities. *Journal of Soil and Water Conservation*. 60:6:288-297.

Faucette, L.B. 2005. Removal and Degradation of Petroleum Hydrocarbons from Storm Water with Compost. Filtrexx® Tech Link #3307

Faucette, L.B. 2005. A Comparison of Performance and Test Methods of SiltSoxx™ and Silt Fence. Filtrexx® Tech Link #3302.

Faucette, L.B., and N. Strazar, A. Marks. 2006. Filtrexx® Polymer and Flocculent Guide. Filtrexx® Library #601.

Fifield, J. 2001. Designing for Effective Sediment and Erosion Control on Construction Sites. Forester Press, Santa Barbara, CA.

Keener, H., B. Faucette, M. Klingman. 2006. Flow-through rates and evaluation of solids separation of compost filter media vs. silt fence in sediment control applications. 2006 American Society of Agricultural and Biological Engineers Annual International Conference, Portland, OR. Paper No. 062060.

KY TC, 2006. Kentucky Erosion Prevention and Sediment Control Field Guide. Kentucky Transportation Cabinet.

Marks, A., R. Tyler, and B. Faucette. 2005. The Filtrexx® Library. Digital publication of support tools for the erosion control industry. [www.filtrexxlibrary.com](http://www.filtrexxlibrary.com).

Marks, A., and R. Tyler. 2003. Filtrexx International Company Website. Specifications, CAD drawings, case histories. [www.filtrexx.com](http://www.filtrexx.com)

Tyler, R.W., and A. Marks. 2004. Erosion Control Toolbox CD Kit. A Guide to Filtrexx® Products, Educational Supplement, and Project Videos. 3 CD set for Specifications and Design Considerations for Filtrexx® Products.

Tyler, R.W., J. Hoeck, and J. Giles. 2004. Keys to understanding how to use compost and organic matter. IECA Annual Meeting Presentations published as IECA Digital Education Library, Copyright 2004 Blue Sky Broadcast.

Tyler, R.W. 2004. International PCT Patent Publication #: WO 2004/002834 A2. Containment Systems, Methods and Devices for Controlling Erosion.

Tyler, R.W., A. Marks. 2003. Filtrexx® Product Installation Guide. Grafton, Ohio.

Tyler, R.W. 2003. International PCT Application #: PCTUS2003/020022. Containment Systems, Methods and Devices for Controlling Erosion.

Tyler, R.W., 2003. US Patent Publication #: 2003/0031511 A1. Devices, Systems and Methods for Controlling Erosion.

Tyler, R.W., and A. Marks. 2003. A Guide to Filtrexx® Products. Product Descriptions and Specifications for Filtrexx® Products.

Tyler, R.W., 2002. US Patent Application #10/208,631. Devices, Systems and Methods for Controlling Erosion.

Tyler, R.W. 2001. Provisional Patent Application #60/309,054. Devices, Systems and Methods for Controlling Erosion.

Tyler, R.W. 2001. Filtrexx® Product Manual. Specifications and Design Considerations for Filtrexx® Products, Grafton, OH.

Tyler, R.W. 1996. Winning the Organics Game – The Compost Marketers Handbook. ASHS Press, ISBN # 0-9615027-2-x..

Tyler, R.W. 2007. US Patent # 7,226,240 “Devices, Systems and Methods for Controlling Erosion” Issue date 6-5-07.

US EPA NPDES Phase II. 2006. Compost Filter Socks: Construction Site Storm Water Runoff Control. National Menu of Best Management Practices for Construction Sites. [http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con\\_site.cfm](http://cfpub.epa.gov/npdes/stormwater/menuofbmps/con_site.cfm)

**Table 3.1.** Filtrexx SiltSoxx® Mesh Material Specifications.

<b>Material Type</b>	<b>NATURAL ORIGINAL</b> (Cotton Fiber)	<b>NATURAL PLUS</b> (Wood Fiber)	<b>BASIC</b> (5 mil High Density Polyethylene HDPE)	<b>BASIC PLUS</b> (Multi-Filament Polypropylene MFPP)	<b>DURABLE</b> (Multi-Filament Polypropylene MFPP)	<b>ORIGINAL / DURABLE PLUS / DURASOXX HD</b> (Multi-Filament Polypropylene MFPP)	<b>EXTREME</b> (Multi-Filament Polypropylene MFPP)
Material Characteristic	Biodegradable	Biodegradable	Photodegradable	Photodegradable	Photodegradable	Photodegradable	Photodegradable
Design Diameters	5 in (125mm), 8 in (200mm), 12 in (300mm)	5 in (125mm), 8 in (200mm), 12 in (300mm)	8 in (200mm), 12 in (300mm), 18 in (400mm)	8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)	5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm), 32 in (800mm)	5 in (125mm), 8 in (200mm), 12 in (300mm), 18 in (400mm), 24 in (600mm)	8 in (200mm), 12 in (300mm)
Mesh Opening	1/8 in (3mm)	1/8 in (3mm)	3/8 in (10mm)	3/8 in (10mm)	1/8 in (3mm)	1/8 in (3mm)	1/16 in (1.5mm)
Tensile Strength (ATSM D4595) <sup>1</sup>	MD: 193 lbs TD: 158 lbs	MD: 210 lbs TD: 289 lbs	MD: 211 lbs TD: 79 lbs	MD: 236 lbs TD: 223 lbs	MD: 545 lbs TD: 226 lbs	MD: 670 lbs TD: 423 lbs	MD: 1062 lbs TD: 797 lbs
% Original Strength from Ultraviolet Exposure (ASTM G-155)	ND	ND	23% at 1000 hr	100% at 1000 hr	100% at 1000 hr	100% at 1000 hr	100% at 1000 hr
Functional Longevity/ Project Duration <sup>2</sup>	up to 12 months <sup>3</sup>	up to 18 months <sup>4</sup>	up to 4 yr	up to 4 yr	up to 5 yr	up to 5 yr	up to 5 yr

<sup>1</sup>Tensile Strength is based on 12" diameter using ATSM D4595. See Filtrexx TechLink #3342 for full tensile strength testing.

<sup>2</sup>Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.

<sup>3</sup>Data based on Caltrans research and specifications

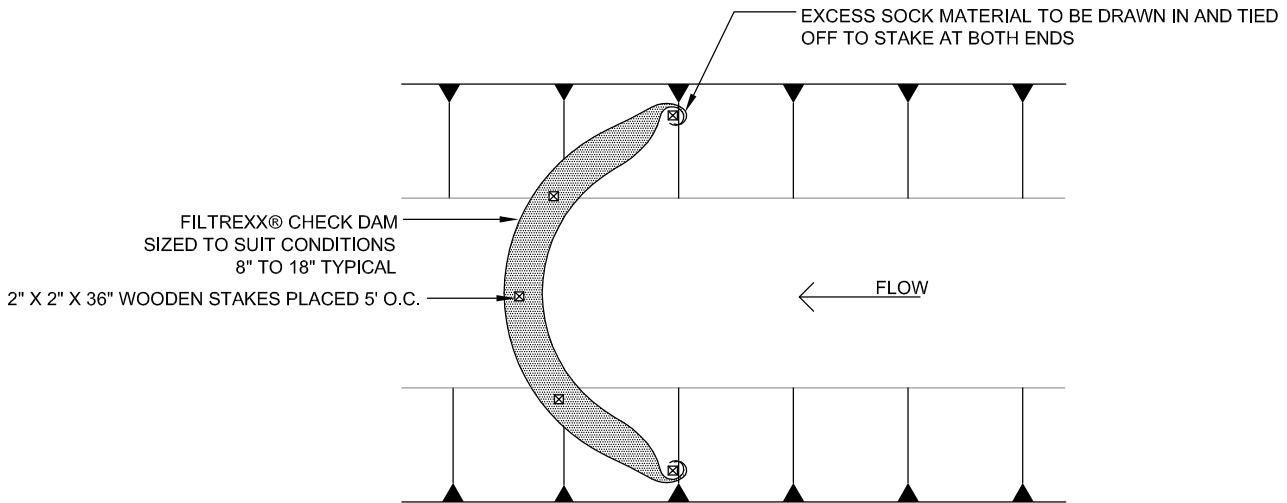
<sup>4</sup>See TechLink #3339 for research & testing

**Table 3.2.** Filtrex® Check Dams Performance and Design Specifications Summary.

Design Diameter	8 in (200mm)	12 in (300mm)	18 in (450mm)	24 in (600mm)	32 in (800mm)	Testing Lab/ Reference	Publication(s)
	Design & Performance						
Effective Height	6.5 in (160mm)	9.5 in (240mm)	14.5 in (360mm)	19 in (480mm)	26 in (650mm)	The Ohio State University, Ohio Agricultural Research and Development Center	Transactions of the American Society of Agricultural & Biological Engineers, 2006
Effective Circumference	25 in (630mm)	38 in (960mm)	57 in (1450mm)	75 in (1900mm)	100 in (2500mm)		
Density (when filled)	13 lbs/ft (20 kg/m)	32 lbs/ft (50 kg/m)	67 lbs/ft (100 kg/m)	133 lbs/ft (200 kg/m)	200 lbs/ft (300 kg/m)	Soil Control Lab, Inc	
Air Space	20%	20%	20%	20%	20%	Soil Control Lab, Inc	
Maximum continuous length	unlimited	unlimited	unlimited	unlimited	unlimited		
Staking Requirement	5 ft (1.5m)	5 ft (1.5m)	5 ft (1.5m)	5 ft (1.5m)	5 ft (1.5m)		
Maintenance Requirement (sediment accumulation removal at X height)	3.25 in (80mm)	4.75 in (120mm)	7.25 in (180mm)	9.5 in (240mm)	13 in (325mm)		
Initial Maintenance Requirement based on Rainfall-Runoff	22 in (55 cm); 1109 L/linear m	32 in (80 cm); 1388 L/linear m	42 in (105 cm); 1825 L/linear m	64 in (160 cm); 2776 L/linear m	86 in (215 cm); 3885 L/linear m	The University of Georgia & Auburn University	
Functional Longevity**	6 mo – 5 yr	6 mo – 5 yr	6 mo – 5 yr	6 mo – 5 yr	6 mo – 5 yr		
Maximum Slope Length (<2%)	600 ft (183m)	750 ft (229m)	1000 ft (305m)	1300 ft (396m)	1650 ft (500m)	The Ohio State University, Ohio Agricultural Research and Development Center	Filtrex Design Tool, Filtrex Library #301, Filtrex Tech Link #3304 & #3311
Hydraulic Flow Through Rate	7.5 gpm/ft (94 L/min/m)	11.3 gpm/ft (141 L/min/m)	15.0 gpm/ft (188 L/min/m)	22.5 gpm/ft (281 L/min/m)	30.0 gpm/ft (374 L/min/m)	The Ohio State University, Ohio Agricultural Research and Development Center; University of Guelph, School of Engineering/ Watershed Research Group	Filtrex Tech Link #3311 & #3313, #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006, Second Interagency Conference on Research in Watersheds, 2006
P Factor (RUSLE)	0.1-0.32	0.1-0.32	0.1-0.32	0.1-0.32	0.1-0.32	USDA ARS Environmental Quality Lab/ University of Georgia	American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006
Sediment Storage Capacity***	174 cu. in (2850cc)	396 cu. in (6490cc)	857 cu. in (14040cc)	1631 cu. in (26840cc)	2647 cu. in (43377 cc)		Filtrex Tech Link #3314
Total Solids Removal	98%	98%	98%	98%	98%	Soil Control Lab, Inc	International Erosion Control Association, 2006
Total Suspended Solids Removal	78%	78%	78%	78%	78%	USDA ARS Environmental Quality Lab	Filtrex Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006
Turbidity Reduction	63%	63%	63%	63%	63%	USDA ARS Environmental Quality Lab	Filtrex Tech Link #3308; American Society of Agricultural & Biological Engineers Meeting Proceedings, 2006
Clay (<0.002mm) Removal	65%	65%	65%	65%	65%	USDA ARS Environmental Quality Lab	Filtrex Tech Link
Silt (0.002-0.05mm) Removal	64%	64%	64%	64%	64%	USDA ARS Environmental Quality Lab	Filtrex Tech Link
Other Recommended Uses	Inlet Protection, Ditch Protection, Slope Interruption	Inlet protection, Ditch Protection, Concrete Washout, Filtration System, Slope Interruption	Ditch Protection, Concrete Washout, Filtration System	Ditch Protection, Concrete Washout, Filtration System	Ditch Protection, Concrete Washout, Filtration System		

\* Based on rainfall intensity of 12.5 cm (5 in)/hr applied to a bare clay loam soil at a 10% slope; runoff flow rate of 108 ml/sec/linear m (0.52 gpm/linear ft); and mean runoff volume of 230 L/m<sup>2</sup> (6.3 g/ft<sup>2</sup>).  
 \*\* Functional Longevity is dependent on mesh material type, UV exposure, freeze/thaw frequency, region of US/Canada, runoff-sediment frequency/duration/loading, and adherence to specified maintenance requirement. Functional longevity ranges are estimates only. Site specific environmental conditions may result in significantly shorter or longer time periods.  
 \*\*\* Sediment Storage Capacity = sediment accumulation behind (directly upslope) + within the device.

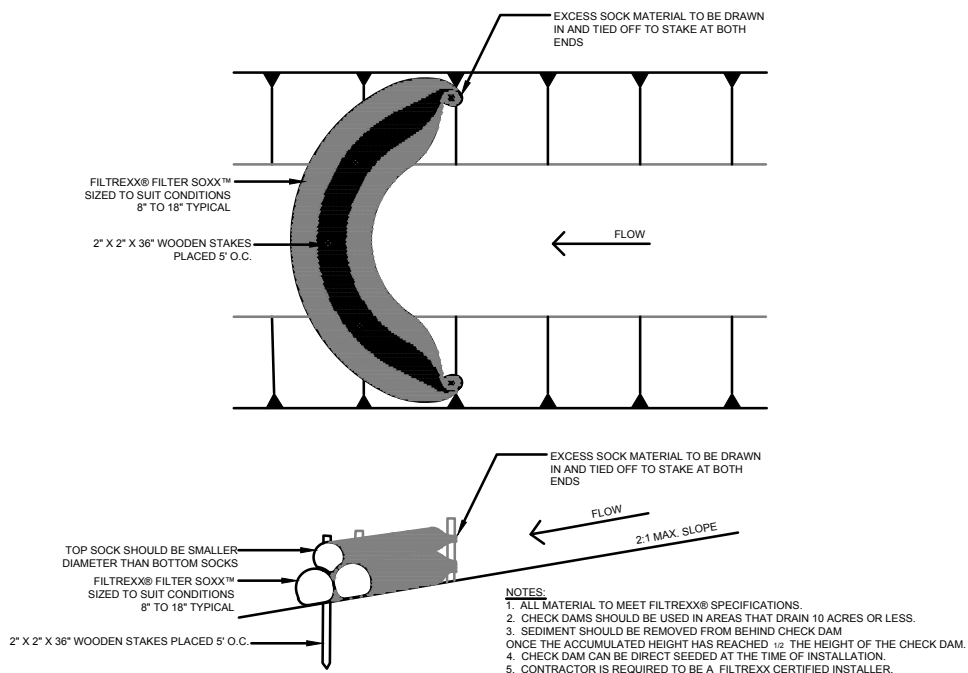
Figure 3.1. Engineering Design Drawing for Check Dam



NOTES:

1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. CHECK DAM SHOULD BE USED IN AREAS THAT DRAIN 10 ACRES OR LESS.
3. SEDIMENT SHOULD BE REMOVED FROM BEHIND CHECK DAM ONCE THE ACCUMULATED HEIGHT HAS REACHED  $\frac{1}{2}$  THE HEIGHT OF THE CHECK DAM.
4. CHECK DAM CAN BE DIRECT SEEDED AT THE TIME OF INSTALLATION.
5. CONTRACTOR IS REQUIRED TO BE A FILTREXX CERTIFIED™ INSTALLER.

Figure 3.2. Engineering Design Drawing for Stacking Check Dam to Increase Design Height.



NOTES:

1. ALL MATERIAL TO MEET FILTREXX® SPECIFICATIONS.
2. CHECK DAMS SHOULD BE USED IN AREAS THAT DRAIN 10 ACRES OR LESS.
3. SEDIMENT SHOULD BE REMOVED FROM BEHIND CHECK DAM ONCE THE ACCUMULATED HEIGHT HAS REACHED  $\frac{1}{2}$  THE HEIGHT OF THE CHECK DAM.
4. CHECK DAM CAN BE DIRECT SEEDED AT THE TIME OF INSTALLATION.
5. CONTRACTOR IS REQUIRED TO BE A FILTREXX CERTIFIED INSTALLER.



Figure 3.3. Engineering Design Drawing for Inverted Check Dam used for Storm Flow.

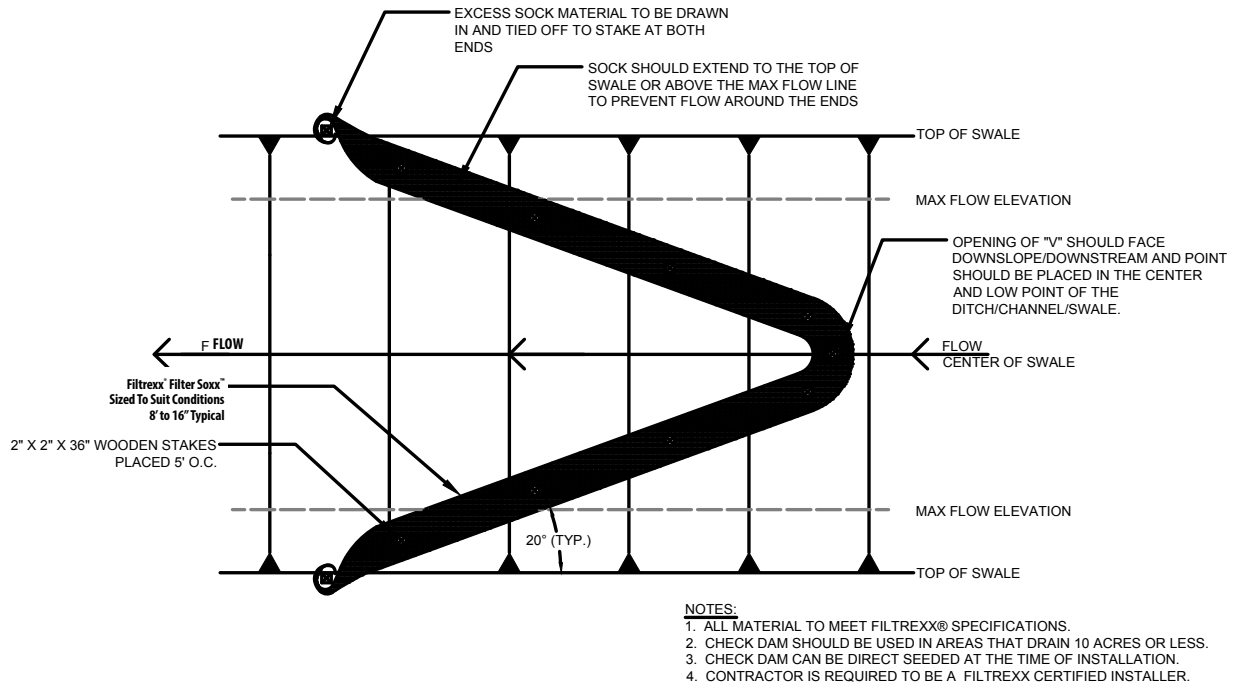


Figure 3.4. Spacing and Height for Check Dam Structures in Drainage Ditches and Channels.

