American Excelsior Company®
Earth Science Division

Proud Participant in NTPEP and Proud Member of:

Curlex® Bloc Natural, Biodegradable Stormwater Filters Receive High Test Scores!

Curlex Bloc was recently tested at an independent third party laboratory according to ASTM D5141. The naturally seed free, stormwater-filtering best management practice (BMP) yielded an average flow rate of 35 GPM/ft^2 at starting conditions of clear water and an average filtering efficiency of 92%!

Figure 1. Clear water exiting Curlex Bloc after being filtered by it.

A flow rate of 35 GPM/ft^2 has been shown through laboratory and field results to be the minimum flow rate for successful filtering sediment control devices. BMPs with flow rates less than 35 GPM/ft^2 are designed to pond water, thus they are referred to as damming devices. In theory, damming devices pond water so sedimentation occurs in the slower water and overtopping flows discharge into the pool created by the down gradient device. However, damming products cause hydrostatic pressure to increase as depth rises. Commonly in field applications, increased hydrostatic pressure leads to scour under or around damming devices before overtopping occurs. If overtopping is reached, scour holes on the down gradient side of the damming device are common. Ponded water from damming BMPs commonly drowns vegetation, which creates bare, unprotected areas. Unvegetated areas introduce weak spots for erosion to commence.

Filtering products, such as Curlex Blocs, are designed to be porous and work with Mother Nature by allowing runoff to flow through them as opposed to causing hydrostatic pressure to increase. As runoff flows through the filtering device, sediment and other contaminates are trapped within and clear water exits the device, if the proper fiber matrix is used (see Figure 1). Filtering products minimize ponding, thus they promote vegetation establishment.

Curlex Blocs are made from Great Lakes aspen excelsior fibers and biodegradable containment material. Research by Boving and Zhang (2004) has quantified the capability of Great Lakes Aspen excelsior fiber's capability to remove polynuclear aromatic hydrocarbons (PAHs) from contaminated runoff. PAHs are typical components of asphalts, fuels, oils, and greases, which are common to roadside runoff that ends up in concentrated flow channels. With this in mind, it is very important to allow flow through Great Lake Aspen products so contaminated runoff can contact the matrix.

850 Avenue H E | Arlington, Texas 76011
Phone 1-800-777-SOIL | Fax 817-385-3585 | www.Curlex.com

Dense designs do not allow water to contact the fibers so filtering does not have a legitimate chance. Materials made of the exact same matrix can perform drastically different at different densities. For example, laboratory and field research has shown that more porous products work better because dense products tend to scour in channelized flow applications.

The matrix of a sediment control device greatly effects performance. Today basically anything is being used as filler for sediment control products in some areas even to the extent of fillers being a convenient way to dispose of a waste stream. Engineered, curled and barbed Great Lakes aspen excelsior fibers that contain 80% a minimum of 6 inches long that are 0.031 inches ± 0.008 inches wide x 0.027 inches ± 0.006 inches thick have been proven to be ideal for sediment control filtering matrices. Larger wood fibers, chunks, or chips tend to float during hydraulic events. Smaller wood fibers such as mulch-like materials or saw dust tend to compact too much resulting in a dense, damming matrix. The type of wood fiber is also extremely important. Aspen excelsior fibers are free of toxins and have been successfully used in revegetation efforts since the 1960s. Other wood types, such as pine, contain toxic resins and should not be used for erosion control, sediment control, or revegetation applications. Pines are high in terpenes, which are a class of hydrocarbons similar to many found in gasoline or paint thinner (i.e. turpentine).

In addition, the matrix of sediment control devices can have negative environmental impacts, if not produced from a known, controlled raw material. If allowed, non-engineered matrices should provide certified testing on each shipment to verify nutrients, heavy metals, noxious weed seeds, invasive species, or other detrimental contaminates will not be released from them during hydraulic events. For example, Gulliver (2011)[a] along with the University of Minnesota and the Minnesota Pollution Control Agency published a report stating that compost releases phosphorus into water when it is in contact with it. It is imperative to know what is going into our environment so please open up your sediment control products and make sure they meet the specifications you asked for.

The results are "clear" when it comes to using Curlex Bloc as a natural stormwater filter! Minimum performance requirements for naturally seed free Great Lakes aspen excelsior filtering devices are provided in Table 1.

Table 1. Performance requirements for biodegradable, naturally seed free aspen excelsior stormwater filtering devices.

Property	Value	Method
Flow Rate (GPM/ft^2)	≥ 35	ASTM D5141
Removal of Polynuclear Aromatic Hydrocarbons (PAHs) (%)	≥ 95	Quantified research[b]
Slope Soil Loss Reduction (%)	≥ 68	Quantified research[c]
pH Buffering	8 ± 3	ASTM D1117, modified
Fly Ash Filtering (TSS)	≥ 95	Quantified research[d]
Fly Ash Filtering (NTU)	≥ 88	Quantified research[d]

[a] Gulliver, J.S. "Performance of Low Impact Development Practices on Stormwater Pollutant Load Abatement." Minnesota Pollution Control Agency. 319 (2011):1-10. Web. 8 June 2015.
[b] Boving and Zhang, Chemosphere 54 (2004) 831-839.
[c] Kelsey, K., T. Johnson, and R. Vavra. 2006. "Needed Information: Testing, Analyses, and Performance Values for Slope Interruption and Perimeter Control BMPs." IECA Conference Proceedings. P. 171-181.
[d] Kelsey, K. and M. Murley. (2017, January). *Fly Ash Slurry Filtration Using Curlex® Blocs - Quantifying Total Suspended Solids and Turbidity Reduction.* Unpublished internal document, ErosionLab.