

Manufactured Products for Stormwater Inlets



1818

Minimum Measure: Post Construction Stormwater Management in New Development and Redevelopment



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Subcategory: Other

Description

A variety of products called swirl separators or hydrodynamic structures have been widely applied to stormwater inlets in recent years. Swirl separators are modifications of traditional oil-grit separators. They contain an internal component that creates a swirling motion as stormwater flows through a cylindrical chamber. The concept behind these designs is that sediments settle out as stormwater moves in this swirling path, and additional compartments or chambers are sometimes present to trap oil and other floatables. There are several different types of proprietary separators, each incorporating slightly different design variations, such as off-line application.

Applicability

Swirl separators are best installed on highly impervious sites. Because little data are available on their performance (independently conducted studies suggest marginal pollutant removal), swirl separators should not be used as a stand-alone practice for new development. The best application for these products is as pretreatment to another stormwater device or, when space is limited, as a retrofit.

Limitations

Limitations to swirl separators include:

- Very little data are available on the performance of these practices, and independent studies suggest only moderate pollutant removal. In particular, these practices are ineffective at removing fine particles and soluble pollutants.
- The practice has a high maintenance burden (i.e., frequent cleanout).
- Swirl concentrators are restricted to small and highly impervious sites.

Design Considerations

The design of swirl concentrators is specified in the manufacturer's product literature. For the most part, swirl concentrators are rate-based designs. That is, their size is based on the peak flow of a specific storm event. This design contrasts with most other stormwater management practices, which are sized based on the capture, storage or treatment of a specific volume. Sizing based on flow rate allows the practice to provide treatment within a much smaller area than other stormwater management practices.

Maintenance Considerations

Swirl concentrators require frequent, typically quarterly, maintenance. Maintenance is performed using a vector truck, as is used for catch basins. In some regions, it may be difficult to find environmentally acceptable disposal methods. Due to hazardous waste, pretreatment, or groundwater regulations, sediments may sometimes be barred from landfills, from land applications, and from introduction into sanitary sewer systems.

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Effectiveness

While manufacturers' literature typically reports removal rates for swirl separators, there is little independent data to evaluate the effectiveness of these products.

Cost Considerations

A typical swirl separator costs between \$5,000 and \$35,000, or between \$5,000 and \$10,000 per impervious acre. This cost is within the range of some sand filters, which also treat highly urbanized runoff. Swirl separators consume very little land, making them attractive in highly urbanized areas.

The maintenance of these practices is relatively expensive. Swirl concentrators typically require quarterly maintenance. The most common method of cleaning these practices is a vactor truck, which costs between \$125,000 and \$150,000. This initial cost may be high for smaller Phase II communities. However, it may be possible to share a vactor truck with another community. Depending on the rules within a community, disposal costs of the sediment captured in swirl separators may be significant.