

Skimmer Basin Design 101



By Jamie McCutchen

Basic components for effective skimmer basin design

Sediment basins have long been the primary means of providing sediment control on larger construction sites and have generally been accepted as effective. In recent years, the U.S. Environmental Protection Agency has recognized a way to significantly improve sediment basin trapping efficiency by requiring the basins to utilize an outlet that discharges from the surface. The most common and cost-effective method is to utilize a floating pond skimmer. Skimmers have been shown to increase the sediment trapping efficiency of sediment basins by 40% or more. They utilize a gravity flow system with a floating “headworks” to draw water from at or near the surface of the basin over an extended time period, thus discharging the cleaner water at the surface and giving sediment more time to settle to the bottom of the basin.

There are three basic components to effective skimmer basin design: volume, time and flow rate.

Volume. The most common requirement for basin volume is a standard of 3,600 cu ft per acre of disturbed area. This requirement varies from state to state and even by municipal separate storm sewer systems within states, so check your local regulations. It is important to note when selecting the skimmer to drain the basin, the required volume should be used, not the actual volume of the basin. The actual volume may be significantly larger than the required volume, thus if the actual volume is utilized you may discharge the required volume in a much shorter time than the regulations require.

Time. The basic way sediment basins work is by giving sediment particles time

to settle. This is highly dependent on soil type, so some engineering judgment is needed to ensure the system is designed appropriately. Time frames can range from a minimum of 24 hours to a maximum of seven days. Ideally, you should provide as much time as possible, but have the basin drain before the next likely storm event. The most common standard is to allow a range of two to five days to meet regulatory requirements.

Flow rate. Once you have established the required volume and range of time, minimum and maximum flow rates are easily calculated. Based on the range of allowable flow rates, a skimmer can be selected. Some brands determine flow rates using a standard orifice equation, while others use controlled testing. The key is to realize that although you may have several choices of skimmers that seem to be “equal” based on size, it is critical to verify the actual flow rate published by the manufacturer. For example, testing commissioned by the state of Georgia has shown that three different 3-in. skimmers had flow rates that varied by nearly 100%.

One final tip: When specifying a skimmer, it is helpful to also identify the minimum and maximum time frame and flow rates allowable on the plans during permitting. This simplifies the ability to confirm an “equal” during bidding and allow for fair competition between all skimmer brands while minimizing the need for further detailed review by the permitting agencies. **SWS**

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