



Decentralized Systems Technology Fact Sheet

Septic Tank Effluent Screens

DESCRIPTION

A septic tank is a traditional wastewater treatment technology that uses an underground tank to hold and treat wastewater. As wastewater flows into the tank, heavier materials settle to the bottom and form a sludge layer, while lighter greases and fats float to the top, forming a scum layer. Clarified effluent is piped from the center of the tank and into a drainfield, where it percolates into the surrounding soil.

An effluent screen (Figure 1) is a physical device that is placed on the outlet pipe of the septic tank to enhance solids removal from the septic tank effluent. In addition, by preventing excess solids from flowing out into the drainfields with the clarified effluent, these screens help to prevent blockages that can damage the drainfield. Finally, in some cases, a thin layer of organic growth called a “biomat” may build up on the screen. This biomat is rich in anaerobic bacteria, which can help to remove viruses and pathogens from the effluent.



FIGURE 1 EFFLUENT SCREEN

APPLICABILITY

The use of effluent screens in septic tanks is becoming more common in the U.S. Installation of effluent screens on septic tanks is mandatory in more than 50 counties nationwide, as well as in the states of Florida, Georgia, North Carolina, and Connecticut.

ADVANTAGES AND DISADVANTAGES

The two primary benefits of using effluent screens in septic systems are that screens improve the quality of the effluent and extend the life of the leach field. Additional advantages and disadvantages of using effluent screens in septic systems are listed below.

Advantages

- Helps prevent solids from clogging the drainfield.
- Keeps non-biodegradable objects from entering the drainfield.
- Can be placed in existing or new septic tanks.
- Requires little routine maintenance because there are no moving parts.
- Units are relatively inexpensive.

Disadvantages

- Regular clean-out of the effluent screen is required to maintain optimal total suspended solids removal.
- Requires surface access for servicing.

DESIGN CRITERIA

The two primary design considerations for septic tank effluent screens are the location of the screen and the flow area of the screen relative to the size of the tank.

Effluent screens can be placed directly in the septic tank's outlet tee, or in a separate housing unit. When the screen is placed in a housing unit (Figure 2), the housing unit can act as a second settling chamber, increasing the clarity of the effluent before it goes through the screen.

If the effluent screen is located in the outlet tee within the septic tank, it should be placed in the clear-water zone beneath the scum layer and above the sludge layer (Figure 3). The bottom of the screen should extend into the liquid a distance equal to 40 percent of the liquid depth. This should

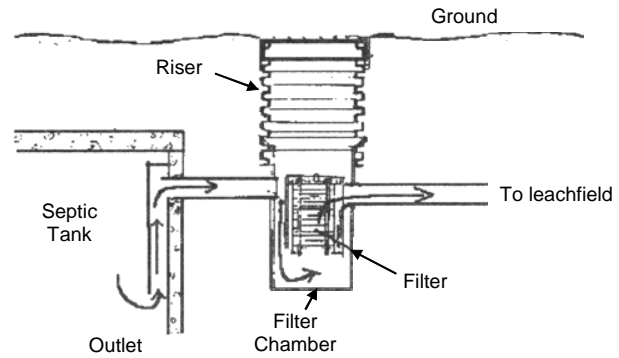


FIGURE 2 EFFLUENT SCREEN LOCATED OUTSIDE THE SEPTIC TANK

Source: Barnstable County (Mass.) Department of Health and Environment (use of Zabel filter), 2003.

ensure that neither scum nor sludge will be transferred onto the screen, and will therefore maximize the clarity of the effluent flowing out of the tank.

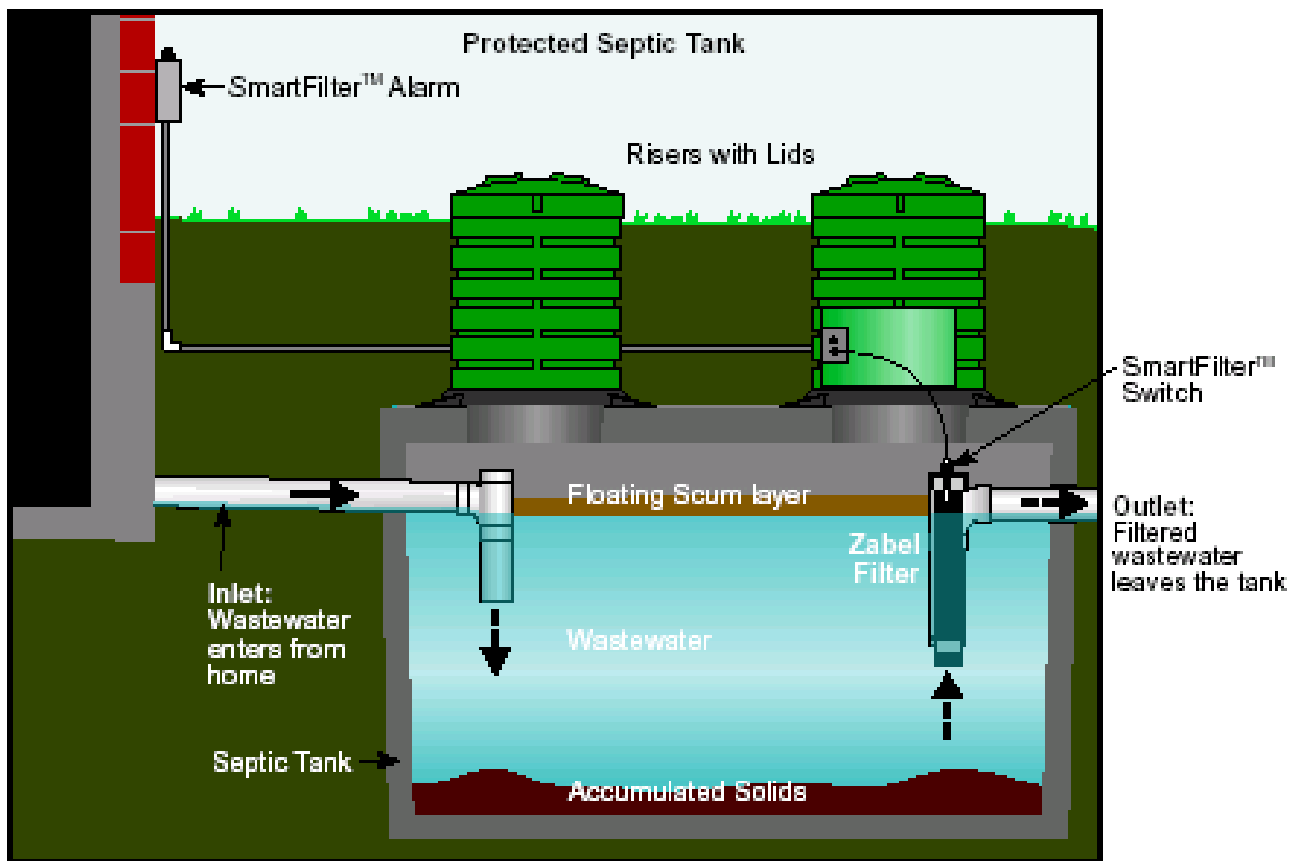


FIGURE 3 FILTER PLACEMENT BETWEEN THE SCUM AND SLUDGE LAYERS

Source: Zabel, 2003.

The other major design consideration is ensuring that the flow area (the combined area of the perforations or openings in the screen through which liquid passes) is sufficient for the flow rate and the solids concentrations in the system. Screens placed in systems with high flow rates and/or high solids content will need higher flow areas to avoid screen clogging. Some screens have an alarm to alert the owner if the filter becomes clogged. This can allow the owner to clean the effluent screen before effluent backs up in the tank.

PERFORMANCE

As described above, effluent screens are designed to remove solids. Most effluent screens have the capability to retain solids that are greater than 3 mm (1/8 in) in diameter. However, solids removal performance for any given septic tank effluent screen will depend on a number of factors, the most important of which is daily flow. The higher the flow, the more likely it is to overload the filter, even at average solids loadings. Larger systems may require multiple filters in a manifold arrangement to treat the daily flow.

Effluent screens can also enhance the decomposition of solids within the tank. Effluent passes through the effluent screen through vertical inlet holes, while larger particles are retained in the tank. As these particles settle in the tank, further decomposition of organic materials occurs.

OPERATION AND MAINTENANCE

Because of their lack of moving parts, effluent screens require minimal maintenance. Nonetheless, lack of attention will lower their overall efficiency, and regular maintenance is important to ensure efficient screen operation.

The primary maintenance activity is cleaning the screen to prevent plugging. When an effluent screen plugs, liquid backs up and cannot exit the tank. To avoid this problem, effluent screens must be cleaned on a regular basis. The cleaning frequency will be dependent on the size of the

screen, environmental conditions, and the type of material entering the septic system. Smaller flow areas and smaller effluent screen openings increase the need for maintenance. Most manufacturers recommend cleaning the screen every one to three years, depending on site characteristics.

COSTS

Effluent screens cost from \$70-\$300 per unit. Installation and servicing add additional costs.

REFERENCES

Other Related Fact Sheets

Septic System Tank
EPA 832-F-00-040
September 2000

Septic Tank Leaching Chamber
EPA 832-F-00-044
September 2000

Other EPA Fact Sheets can be found at the following web address:
<http://www.epa.gov/owm/mtb/mtbfact.htm>

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