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## TECHNICAL BULLETIN

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### **Advanced Enviro-Septic™ Wastewater Treatment System Septic Tank Effluent Filters and Charcoal (Odor) Filters NOT Recommended**

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**Abstract:** *Effluent filters are installed in the outlet from the septic tank with the intended purpose of retaining solids inside the tank, preventing them from entering the treatment system and/or dispersal field. The concern is that if solids escape from the septic tank, they could cause clogging of the system components or the soil interface. While this may be a legitimate concern for some onsite systems, effluent filters can have a detrimental effect on Advanced Enviro-Septic (AES) technology<sup>1</sup>; therefore, they are not recommended by Presby Environmental (PEI) for the reasons explained below.*

#### **Effluent filters are subject to clogging and need frequent maintenance:**

The biggest problem with most effluent filters is that they inevitably (and sometimes quickly) become clogged with the solids they are designed to capture. Many system owners are completely unaware of the ongoing maintenance requirements when an effluent filter is used; as a result, the filters tend not to receive the attention they require, and this lack of maintenance can have an adverse effect on the entire AES wastewater treatment system. Once the apparatus is clogged, it no longer functions as intended. In effect, the clogged filter creates a blockage in the connection between the septic tank and the treatment/dispersal field. Based on our years of troubleshooting experience, we have determined that clogged effluent filters are a common problem that often results in system malfunction in those states where they are required or when utilized by the designer or installer contrary to PEI's recommendation. Unfortunately, clogging is not easy to detect; therefore, frequent monitoring and ongoing preventive maintenance of the filter must be performed by the system owner.

#### **Effluent filters can interfere with oxygen supply to the AES System:**

When an onsite system is subjected to exceptionally heavy use in a short period of time, this is referred to as "flash loading." For example, when a three-bedroom house hosts a family reunion weekend, multiple houseguests and visitors would be using the plumbing facilities; as a result, the water used would far exceed the system's daily design flow. Flash loading can also create problems for effluent filters. An excessive volume of water enters the system faster than a partially-blocked filter can handle. This causes the septic tank to fill up quickly, which causes the "scum" layer (accumulated solids and grease that float on the surface of the wastewater in the septic tank) to rise above the level of the effluent filter. If the overuse is of sufficient volume, wastewater may start to back up into the interior plumbing fixtures. When the home's usage returns to normal levels, the water level in the tank decreases, and the scum layer also recedes. However, some scum may end up lodged on top of the effluent filter in the process, blocking the flow of air through holes in the top. In this scenario, the system owner is likely to be completely unaware of the blockage; since only the top of the filter is blocked, the filter continues to allow water to pass from the septic tank to the treatment field, and the system would appear to be operating normally. However, with the top of the effluent filter blocked, oxygen supply to the system is disrupted, which in essence may cause the system to slowly suffocate. Some effluent filter designs do not feature a ventilated top, meaning air will never pass through, regardless of whether the filter is clogged or not.

A recent study by researchers at the University of California Davis examined how effluent filters affect the oxygen flow to septic systems (*Evaluation of Greenhouse Gas Emissions from Septic Systems*, 2010, Leverenz, et al.) The researchers concluded that when no effluent filter is used, an average passive system receives 150 to 400 cubic meters of air flow per day. However, when an effluent filter is used, air flow was found to be much less, in the range from 10 to 70 cubic meters per day. This means that the use of an effluent filter was determined to reduce the air flow quite significantly--in excess of 80%--even if the filter is not blocked or clogged.

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<sup>1</sup> Advanced Enviro-Septic® (AES) is the next generation of Presby Environmental's Enviro-Septic® technology. The comments and recommendations contained in this Technical Bulletin apply to both products.

## **AES Technology is Aerobic:**

As is the case for all onsite treatment systems, AES relies on oxygen to support the bacterial processes that purify wastewater. In the typical AES installation, there is a low vent at one end of the system, and the house plumbing (roof) vent serves as the high vent. A high and a low vent are required to facilitate the movement of air throughout the entire AES system. Air enters the AES System through the soil and the low vent, travels throughout all the rows of the AES system, then moves into the air space above the effluent in the septic tank. It is the "chimney effect" of the high vent that pulls the air through the system and releases it through the roof (high) vent. Not only does this supply necessary oxygen to the AES system, it also provides a mechanism for releasing gases produced by bacterial processes. However, a clogged effluent filter can completely cut off the flow of oxygen and turn conditions in the treatment field from aerobic to anaerobic. It can also prevent wastewater from exiting the septic tank as it should. These situations are often not observable until odor, sewage backing up into the interior plumbing, or surfacing of effluent gets the system owner's attention; by then, the system's functionality may have already been compromised. (Note: it is possible to Rejuvenate an AES System to restore aerobic conditions; refer to information in our Manuals, on our website, or call our Technical Advisors for more information.)

## **Why effluent filters are not recommended with AES Technology:**

PEI recommends that all septic tanks used with an AES system include sanitary tees (open-topped baffles) at their outlet to prevent solids from leaving the septic tank. Sanitary tees have proven to be very effective at retaining solids within the tank while showing no tendency to clog; they require no ongoing maintenance and are typically inspected at the same time the septic tank is pumped (about every 3-5 years, depending on use). In addition, the AES pipe is designed to handle wastewater that contains a small amount of solids. The unique design of AES helps retain any residual solids inside the pipe, preventing them from reaching the protected bacterial treatment surfaces that form within the geotextile layers that surround the pipe. The solids retained inside the AES pipe do not accumulate over time; rather, these solids continue to be digested by the flourishing bacterial eco-systems that develop throughout the AES System. Because of its unique design and method of operation, effluent filters are not necessary and do not enhance AES System function. In fact, there is significant potential for effluent filters to compromise treatment and system longevity due to their tendency to become clogged. For these reasons, PEI does not recommend effluent filters for use with AES systems.

Please note that effluent filters were not utilized in any of our third-party product testing, which has resulted in NSF Standard-40 Class I Certification and BNQ Secondary and Advanced Secondary certifications. The excellent results obtained by our test systems (with BOD5 and TSS consistently less than 10 mg/L.) demonstrate that AES' design enables it to treat wastewater very effectively without the use of an effluent filter. Photographic evidence of the test systems in operation provides documentation that very little solid material escapes from the septic tank when baffles/tees are used, further indication that effluent filters are not needed with an AES system.

## **Charcoal (Odor) Filters:**

For similar reasons, PEI does not recommend using charcoal filters. Charcoal filters are sometimes installed in the ventilation system of an onsite system in order to control objectionable odors. However, these charcoal filters also show a tendency to become blocked, often merely from condensation and/or freezing. When this happens, it prevents air flow through the system and has a detrimental effect on aerobic treatment processes. Even when they are not blocked, these filters reduce air flow to the system; this reduced oxygen supply creates anaerobic conditions which produce more odor than when aerobic conditions are maintained. In most cases, a properly functioning AES system should not produce a detectable odor from the low vent. Low vent odor should be considered a symptom of an underlying problem; the root cause should be identified and corrected immediately. Masking the odor amounts to treating only the symptom and delaying an accurate diagnosis. It is always preferable to address any service or maintenance issue promptly to prevent damage to the system and minimize repair costs.

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