



THE BEAR ESSENTIALS™

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The bear essentialstm

SPECIAL POINTS OF INTEREST

- Gas transport is a critical issue for all septic tanks, plastic as well as concrete
- Tank manufacturers should list approved products for use with their products
- NSF should add venting as a criteria to Standard 46

“But hydrogen sulfide gas, in particular, is ‘heavier’ than other gases typically found in a septic environment, and tends to build up right at the surface of the water.”

Are Some Effluent Screens/Filters Keeping More in the Tank Than Solids?

Over the last several months, I’ve had numerous conversations with Precasters, Regulators and a few manufacturers of Advanced Treatment Systems about a topic that seems to be cropping up more and more frequently: how gases flow within the septic tank. Some of these conversations were offshoots of discussions about another issue: concrete tank corrosion that seems to be occurring in all parts of the country. Apparently I’m not the only one discussing these topics, because I’ve noticed recently that issues of both *Pumper* and *Onsite Installer* magazines have featured articles and commentaries on concrete tank corrosion, with several onsite professionals weighing in on what they think is leading to the etching.

Although many of the authors suggested that a buildup of hydrogen sulfide gas above the waterline is causing the corrosion problem, few have hypothesized as to “why” this gas level is increasing to the point it is causing corrosion in the tank. As an inventor and manufacturer in the onsite wastewater industry, it’s important for me to understand how products in a system work together to solve, or possibly create, problems. As surprising as it may seem, I’ve come to the conclusion that some effluent screens may be contributing to the problem of tank corrosion, and I’m encouraging further research into this theory.

Let me explain some of how I’ve come to this conclusion:

Last March, Bill Kistner of Kistner Concrete Products in New York called me to talk about effluent filters. He explained that the recent discussions of tank corrosion led him to conduct an inspection of installed tanks in his area. Paul Rowe, P.E. at Kistner Concrete has led the research efforts in this area and his report will be published soon, but what follows is just a brief synopsis of his findings: not all of the tanks he inspected had corrosion issues; however, most of the tanks that *had a* corrosion environment had something in common—they had an effluent screen installed in the tank. Kistner suspected the screens may somehow contribute to the corrosion environment and he wanted to know my opinion of this theory. All of these were the smaller-size effluent screens; we did not discuss which company or companies manufactured the screens. This was the first time, to my knowledge, that anyone had even remotely connected the use of effluent screens with the concrete corrosion problem, and for me, a light started to go on.

My initial thought was that this corrosion problem appears predominately in northern states such as Indiana, Michigan, New York and Wisconsin. So I decided to call a Precaster in a southern state to ask him if they, too, were noticing concrete corrosion in septic tanks. Although he reported some tanks were experiencing corrosion, it didn’t seem to be as big an issue as it was in the northern states. I asked (continued on page two)

MORE IN THE TANK THAN SOLIDS?

if he had seen more of a problem with corrosion over the past ten years, and he indicated that was indeed the case.

That ten-year time frame is important, because I knew that this particular southern state started requiring effluent screens about that time. Any of you who have heard me give my presentation on the “Evolution of Effluent Filters” knows that Bob Zabel introduced his A100 Model Filter over 50 years ago. So why would this possible build-up of hydrogen sulfide gas become an issue now and not years before?

this route for venting.

Some may point out that national plumbing code requires that septic tanks be vented through the plumbing and out through the roof vent. Hydrogen sulfide gas, in particular, tends to be released in to the septic tank environment as it is “heavier” than other gases typically found in a septic environment, and tends to build up right at the surface of the water. There are many drivers for air and gas movement through the septic system and this can be noteworthy for future studies, but

it is sufficient to say preserving the cross sectional area for venting to occur in a healthy septic system is critical. That is, unless we close off that route by designing effluent screens and filters without significant open areas above the invert of the outlet.

As a manufacturer of effluent filters, you may think it would be against my own interests to point out potential problems with the use of effluent screens and filters in onsite wastewater systems. But as an inventor of products designed to solve problems, (continued on next page)



Note the etching of the lid directly above the T-Baffle in the photo above, and the corrosion of the D-Box sidewall in the photo below.



“Why would this possible build-up of hydrogen sulfide gas become an issue now, and not years before?”

Let’s look back to when effluent screens first were introduced into the marketplace. Once these were required in the state of Florida, it soon became evident that this could be a very lucrative market. In the rush to bring products to market to compete with the Zabel 1801 screen cartridge, companies latched onto the concept that they could simply cap the top and bottom of their cartridges to allow for “outside-in” flow; the issue of how effluent screens impacted the flow of gases in the septic tank wasn’t raised at the time, so little thought was given to what the consequences would be to the overall system by closing off

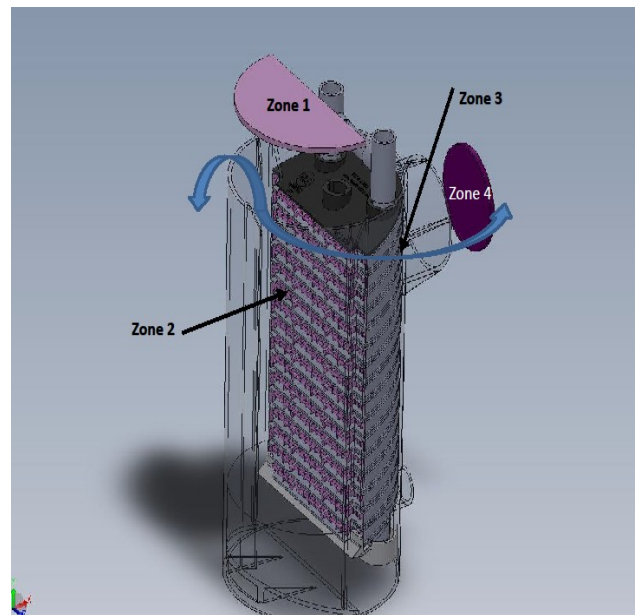


Figure 1: The flow of air through various areas of the Bear Onsite ML3 series of filters is depicted in the graphic above. To see how much open area for gas transport above the water in the tank is available, refer to the chart on the following page. Zone 4 is universal for all filters and screens using a four-inch tank outlet.

MORE IN THE TANK THAN SOLIDS (CON'T)

mainly effluent screens and filters, I'm willing to lead the discussion, because my greater concern is the potential for more states that have made the responsible step to require effluent filters to now turn around and paint all effluent screens and filters with the same brush strokes (or throwing the baby out with the bathwater!) Instead, research institutions should begin looking into this theory, and publishing their findings. Since no one has suggested that having *more* ventilation in effluent

filters would lead to problems, it would be prudent for regulatory agencies to ask manufacturers to publish not only how much area they have for filtration *below* the outlet invert, but also how much area they have for ventilation *above* the outlet invert. See Figure 1 (page 2) and Table 1 (below) for examples of what Bear Onsite, LLC will now be including in its product literature for all of its effluent screens and filters.

Table 1								
Open Area for Gas Transport Above Water Level For Effluent Filters During Operation in Square Inches								
		Zone 1	Zone 2		Zone 3		Zone 4	
Case & Cartridge	Lid Color Code	Open Area to Clear Zone in Case	Open Area into Filter Cartridge	Open Area into Filter Cartridge w/2" Head	Open Area out of Filter Cartridge	Open Area out of Filter Cartridge w/2" Head	Open Area out of the Septic Tank	Open Area out of the Septic Tank w/2" Head
RESIDENTIAL								
ML3-910	Black	31.8	18.38	10.5	6.56	3.75	15.9	8.84
ML3-916	Blue	31.8	15.75	9	4.38	2.5	15.9	8.84
SPECIALTY APPLICATIONS								
ML3-925	Brown	31.8	14	8	2.8	1.6	15.9	8.84
ML3-932	Green	31.8	4.2	2.4	2.19	1.25	15.9	8.84
* Add 0.95 Square Inches to Zone 2 for an Alarm Port when appropriate.								

Table 1: This chart shows the amount of open area for gas transport above the water level for Bear Onsite ML3 series of filters, in square inches; refer to the Figure on previous page to see each zone that is depicted.

Could decreased oxygen in filtered systems also impact drainfield performance?

This past March, I also had a discussion with a drainfield manufacturer at the 2011 Pumper Show in Louisville. His concern was getting the maximum amount of oxygen out to his treatment field, and he expressed concern that using effluent screens decreased the amount of oxygen reaching the drainfield.

The drainfield manufacturer I spoke with in Louisville followed up by sending me a study conducted by researchers at the University of California Davis, (*Evaluation of Greenhouse Gas Emissions from Septic Systems, 2010, Leverenz, et al.*) that appeared to support his theory that effluent screens were indeed preventing oxygen from getting out to the treatment fields. I have some concerns about this report being used as an indictment against all effluent screens and filters; concerns that are seemingly justified, as you'll read about later on.

After reading this full report, I'd label this document a *cautionary* tale, and one that should lead to further study by other entities. As an industry, we do need to be cautious about relying on single studies or research documents that appear impressive, but upon further study, are questionable when used to draw *absolute* conclusions. This study, for example, only looked at *eight* septic tanks, only *two* of which contained effluent screens, and both of these screens were designed with closed tops and outside-in flow paths. Yet, apparently at least one state, Indiana, has a regulatory agency now ready to "throw the baby out with the bathwater"—by allowing a company to claim an exemption from the requirement for effluent screens in their treatment systems, based on this study alone. I don't believe it is either relevant or statistically accurate to draw conclusions based on such a small sampling. A far more prudent course would be

for states to look at this study as a starting point for further investigation, and also look at the impact on the flow of gases of other effluent screens and filters with much larger open areas for gas transport.

Innovative and responsible manufacturers shouldn't try to ignore new research or shy away as new impacts of their products are discovered, even if the impacts appear negative at first, but should adapt products to solve problems once they are identified. Consequently, bits and pieces of research should not be pulled out of the context of an overall study and be accepted as "gospel" by regulatory agencies who, as a result, give one company a competitive advantage over their competition. The research done by the University of California Davis didn't begin as a way to identify what's causing concrete tank corrosion, but it may be a call to action for more in-depth study that investigates the link between restricting the flow of gases in the septic tank to corrosion. That is what I'm asking for in even writing this article. As a former regulator, and now small business owner, inventor and manufacturer, I think it's high time we started holding all aspects of our industry—regulatory, research & development, and manufacturers—accountable for their products and start moving our industry forward.

While research is being conducted to determine the validity of this theory, what can be done to insure that these products (effluent screens and filters) are performing at a high level? Several things! If NSF Standard 46 certification continues as the benchmark for performance in our industry for effluent screens and filters, then NSF should address the issue of venting as potential test criteria that may need to be added to NSF Standard 46 certification procedures. This issue is important, not just because of its po-

tential link to concrete tank corrosion, but because the critical transport of oxygen through all types of pretreatment tanks, plastic as well as concrete, is becoming an even more important component of new and advanced treatment systems.

Tank manufacturers can also use this research regarding gas transport to redefine some of their business practices, and take the opportunity to protect their business investments and reputations. They can evaluate product information by the manufacturers on effluent screens and filters currently in the marketplace, and then decide on their list of screens and filter models they deem acceptable for use with their tanks. This information should then become part of their state approval, so that if anyone uses a product they have not approved for use in their tanks, then they should not be held responsible for any problems that arise later. Just as a car manufacturer does not put the oil and gasoline into every vehicle they sell, they most certainly specify what minimum standard must be met for these "after-market" items in order for them to warranty the engine. Without specifying which screens and filters are acceptable in their products, tank manufacturers are by default being held responsible for *all* products, even those that may be adversely affecting the tanks and the treatment systems they are supposed to be protecting.

Note: Theo Terry is the President/CEO of Bear Onsite, LLC. He holds thirteen United States Patents for wastewater products, five of which are for effluent filters, and another six are pending. He has developed effluent filters for Zabel Environmental Technology, Best Technology, Ring Industrial Group, and now his own company, Bear Onsite. Visit www.bearonsite.com to learn more about effluent filters and his company.