



TAC Advisory
Onsite Wastewater Treatment Sampling: Grab vs. Composite Samples

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OVERVIEW

Wastewater sampling and laboratory analysis is sometimes required to determine if an onsite wastewater treatment system component is functioning satisfactorily or to help in trouble shooting problems. Color, odor and field measurements, such as dissolved oxygen and pH, of the wastewater may give important information to trained personnel when assessing system performance or trouble shooting, but it may not be adequate to determine if a component is meeting a desired standard.

Effluent chemistry is much more variable than other characteristics that can be observed. Flow volumes passing through the system vary with time of day and day of the week, especially on weekends. As flow varies, it can cause water quality parameters to vary as well. Grab samples are only a reflection of what is happening within the system at the time of sampling and may not be representative of the norm or long term average of effluent characteristics.

A representative wastewater sample is one that adequately reflects the actual chemistry of the wastewater at one point in the onsite system. A **grab sample** is a discrete sample collected manually at a specific time and from a specific place in the waste stream. A **composite sample** is a series of samples of equal volume taken at a predetermined time or after a predetermined amount of flow. These samples are then combined into one sample for analysis. The series of samples may be obtained with an automated sampling device or, may be a series of grab samples taken in one of the methods noted above. The most representative composite sampling is conducted on a flow proportionate basis which provides a relatively accurate representation of wastewater parameters.

GRAB SAMPLES

Grab samples are simpler to obtain and do not require expensive equipment. Samples are often obtained at a time convenient for the person doing the sampling rather than at a consistent time when the flow characteristics are likely to be similar. They may be helpful in trouble shooting problems as they give an insight into wastewater chemistry. However, grab samples may not be representative and therefore are a poor measure of performance of a specific system component.

Grab sampling assumes uniform chemistry over time. However, for most wastewater system components, there is no period throughout the day or week when the average wastewater chemistry can be measured in a single grab sample. Each sample is representative of chemistry only at the time and place at which the sample was taken. For treatment systems that by nature are very consistent and/or have a lot of averaging processes built in, grab samples may be adequate indicators of system performance. An example of such a system is a recirculating sand filter where there is a large recirculation tank that serves as an averaging device and the sand filter itself has storage and blending built in that adds to the averaging process.

COMPOSITE SAMPLES

Considering analytical costs, composite samples may be less expensive in that only one sample is analyzed rather than a large number of separate grab samples. However they may be more expensive overall if an automated sampling device must be purchased or multiple trips must be made to obtain multiple samples. Composite sampling is the best method to evaluate performance of biological treatment devices. It is a measure of system performance over time and provides a representative assessment of the characteristics of the treated wastewater.

ADDITIONAL POINTS TO CONSIDER

It is very difficult to obtain a representative sample of septic tank influent. A representative sample of septic tank effluent may also be difficult to obtain unless there is a chamber into which the effluent flows.

In any sampling process, one must always be careful that the material that adheres to the sides of system components around the point of sampling does not fall into the sample container during sampling and skew the results.

A pump chamber may serve as a “compositor” of wastewater. A grab sample taken from a pump chamber is more similar to a composite sample if there is significant residence time in the pump chamber such as 12 hours or more following secondary treatment devices and 24 hours or more following septic tanks.

SUMMARY

In most situations a grab sample will be helpful in trouble shooting but it will not accurately determine if an onsite wastewater system component is meeting a set standard. Trained, experienced personnel may tell more from looking at and smelling a sample than from what is revealed by analysis of a single grab sample. If one wishes to determine the performance of an onsite wastewater treatment system component, composite samples would be the recommended method.