



BETTER WATER. BETTER WORLD.®

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Testing Protocol for FAST® Wastewater Treatment System

At any time plants manufactured by Bio-Microbics, Inc. can be tested for performance, it is imperative that samples are collected properly and analyzed correctly by appropriate methods so that the results provide accurate representation of the performance of our plants. Anything short of that can result in misleading results and unnecessary or ineffective process changes. All representatives of Bio-Microbics, Inc. will use the following protocol when sampling FAST® Wastewater Treatment Systems.

- I. Sampling Equipment
 - A. It is required that equipment designed for proper sampling be used. All samples should be collected in sample bottles provided by a certified laboratory. A means to collect samples where the sampling point is difficult to reach shall be provided, i.e. a pole with a sampling container attached.
 - B. Each sample will require at least 3 labeled sample bottles.
 1. Samples collected for TKN and ammonia concentrations require a preservative and should have the preservative put in the bottles by the laboratory.
 2. Samples collected for NO₃ and NO₂ will have one bottle.
 3. Samples collected for BOD and TSS will have one bottle.
 4. Samples collected for pH may require another bottle.
 - C. Dissolved oxygen and pH meters that are calibrated at the site by a trained individual and a thermometer will be provided.
 - D. A sludge measurement device, such as a "Sludge Judge".
 - E. A logbook to record pH, DO and temperature will be provided. Sample time, flow conditions, sampler's name and a verbal description of the effluent indicating the relative amount of solids, the clarity, and any color or odor, detected will also be recorded.
 - F. A cooler stocked with wet ice will be provided every day that samples are to be collected.
 - G. A chain of custody sheet to be completed by the sampler.
 - H. A brush will be provided to facilitate cleaning of the effluent discharge pipe in preparation for the collection of effluent samples.
 - I. A garden hose with a back-flow preventor attached to the end hooked to the home. This will be used for inducing hydraulic flow for sampling in situations where there is not a free flowing effluent at the time of

collection. The hose should be inserted into the wastewater system far enough upstream of the treatment system to induce the flow through the system, but not affect the sample collected in any way. The preventor is necessary to protect the water supply of the home from possible contamination. An apparatus should be supplied that would help hold the hose up out of the sewage when possible.

- J. Antibacterial soap and distilled water will also be provided for cleaning of collection equipment.
- K. Latex gloves and eye protection will be provided.

II. Sampling techniques

- A. A grab sample must be taken from a free flowing effluent pipe. The pipe will most likely be located in a distribution box or pump chamber down stream from the treatment unit. It is very important that the pipe be cleaned (see D).
- B. If flow is not present, connect the garden hose to an outdoor faucet. The hose should be inserted into the wastewater system far enough upstream of the treatment system to induce the flow through the system, but not affect the sample collected in any way. For most residential units this would be in the inlet to the septic tank. For this location, the hose should be placed in the inlet tee to best simulate influent into the septic tank. The hose should **not** be allowed to run at this location longer than 10 minutes.
- C. Put on protective eye wear and latex gloves.
- D. To the extent possible, use the brush to clean the discharge pipe of attached growth that may dislodge during the process of collecting. Rinse the pipe with the garden hose. (**Note:** If the pipe is not accessible for cleaning in this manner – the sampler must be mindful not to touch the pipe when sampling to avoid knocking loose large solids that could contaminate the sample.)
- E. Place the end of the garden hose in position to add water to the first compartment of the septic tank (See step B) – **not** the reaction chamber. Take care to not touch the sewage with the end of the hose. Turn the faucet on.
- F. After the effluent has been flowing out of the pipe for a minimum of 10 minutes, place the collection container into the stream of effluent and rinse any collection containers (including sample bottles) that will contain effluent. **DO NOT** rinse TKN and ammonia sample bottles that contain a preservative.
- G. If a free flowing sample cannot be taken from a pump chamber, then the operator must determine if the contents of the pump chamber are representative of the effluent. The first evaluation of whether this sample will be representative will be to determine if there are settleable solids in the pump chamber. A sludge measurement device should be used to determine if there are any settled solids in the bottom of the pump chamber. If there are any solids, then the pump chamber must

be cleaned out before a representative sample can be taken. The second test for evaluation of the pump chamber will be to measure the dissolved oxygen in the pump chamber. The dissolved oxygen in this chamber must be above 1.0 mg/l for the sample to be representative of an aerobic effluent. If the dissolved oxygen is below 1.0 mg/l, then the pump chamber should not be used for sampling. The third test for evaluation of the pump chamber will be to collect a sample from the pump chamber and compare it to a sample from the reaction chamber. Samples collected from a pump chamber should be taken from six inches to a foot below the surface. This will help to eliminate any floatable solids from affecting the sample. This sample should be compared to a sample collected off of the spray from the reaction chamber. This sample should be allowed to settle for 5 minutes and then compared to the sample from the pump chamber. If the clarity of the two samples are similar, then it can be assumed that the samples are similar. If the pump chamber sample is cloudy or obviously darker than the settled aeration sample, then the pump chamber sample should not be used as a representative sample. If the sample can not be collected from the pump chamber, then a sample should be collected from the reaction chamber. This information should be noted in the log as well as the other observations used to collect this sample.

- H. Take the sample for pH and temperature and test for those parameters immediately. When finished with this sample discard it back into the system and rinse it several times with water.
- I. Take the DO reading inside the reaction chamber and outside the unit in the anoxic zone of the tank.
- J. Record the pH, DO and temperature in the logbook along with the date address and time.
- K. Take the sample bottles and place them into the cooler with the wet ice. The bottles should be well covered by the ice in order to facilitate faster cooling.
- L. Clean the sampling containers with antibacterial soap and water and rinse them with distilled water before collecting another sample.
- M. Fill out the chain of custody sheet with correct sample ID numbers and all other required information and/or pertinent comments. Be sure and sign this sheet and observe the laboratory personnel signing it when you deliver a sample. The samples should be delivered the same day it is collected. If necessary arrangements should be made to deliver the samples after normal business hours.