

# Sampler Contamination in Wastewater Treatment

All WWTP's must take wastewater samples to measure Biological Oxygen Demand (BOD).

BOD is a measure of the rate at which a water sample consumes oxygen when it is injected with an inoculant of aerobic bacteria. The test is performed by inoculating a diluted sample and allowing the bacteria to grow and consume oxygen over 5 days at 20° C.

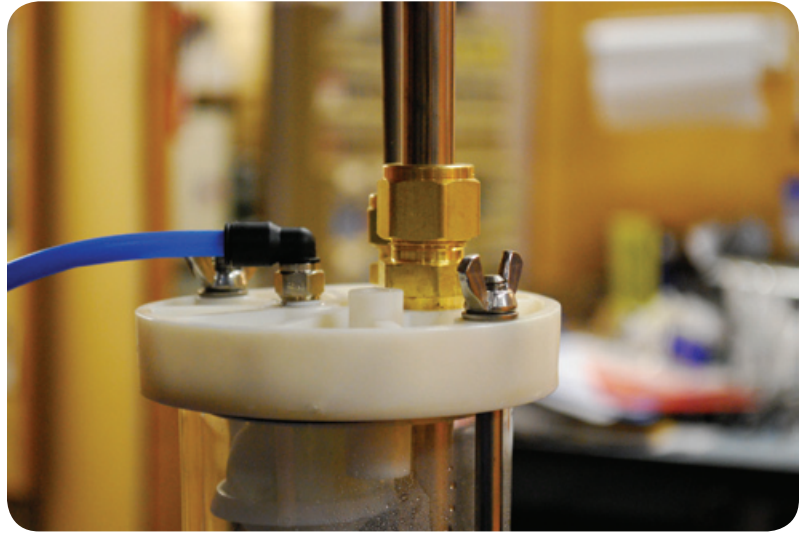
There are 2 types of bacteria which consume oxygen; nitrogenous bacteria which use ammonia as a food source and carbonaceous bacteria which use organic carbon compounds as a food source. Both are normally present in wastewater. The nitrogenous bacteria are very slow growing but when they become established, they consume oxygen at a much higher rate than do the carbonaceous bacteria.

Nitrifying bacteria are not normally a problem in the BOD test because they are so slow growing that they have no impact before the 5 day test period has elapsed. However, this is not the case if the sample is contaminated with nitrifying bacteria from dirty sampling equipment. In this case the BOD result is inflated because of nitrification from the contaminating bacteria.

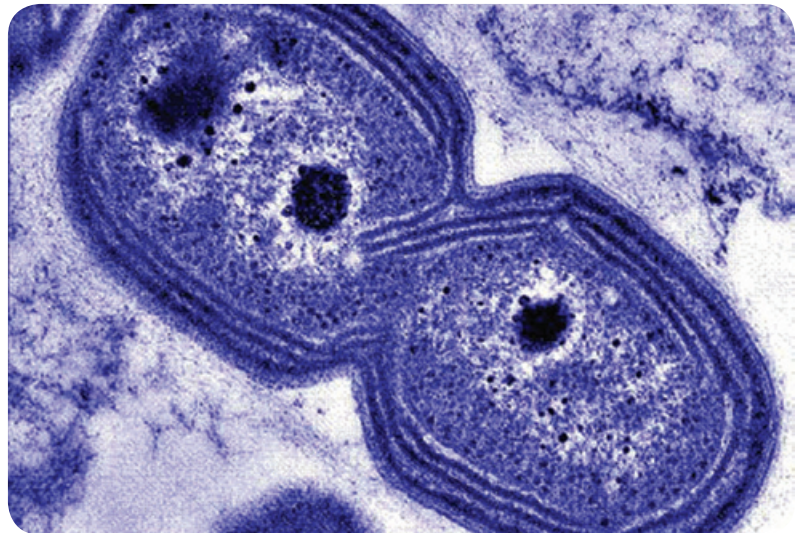
The benefit of SIRCO Samplers vacuum system for drawing in water is that only the metering chamber is subject to contamination, and can be cleaned easily. Peristaltic-pump samplers, on the other hand, pinch the samples as they are drawn through, contaminating the intake tube for subsequent samples. Thus, the BOD test is artificially inflated.

Some regions have chosen to use only vacuum-type samplers, rather than purchasing replacement tubing every week and dealing with artificially inflated results.

Metro Vancouver, in British Columbia, has made every effort to stay away from peristaltic-pump samplers in any of their wastewater treatment facilities for this reason. SIRCO Samplers are in use at every plant.



SIRCO Metering Chambers are easy to swap out. Simply remove the two wing-nuts and replace, easily done within 30 seconds.



Nitrosomonas. Image from The Microbe Zoo (by Yuichi Suwa)

Nitrifying bacteria can artificially inflate the BOD test if they are allowed to remain in the tubing (i.e. in peristaltic samplers).

Technical Source: Brian Hystad, Supervisor, WWTP Division, Metro Vancouver, BC, 2009.