

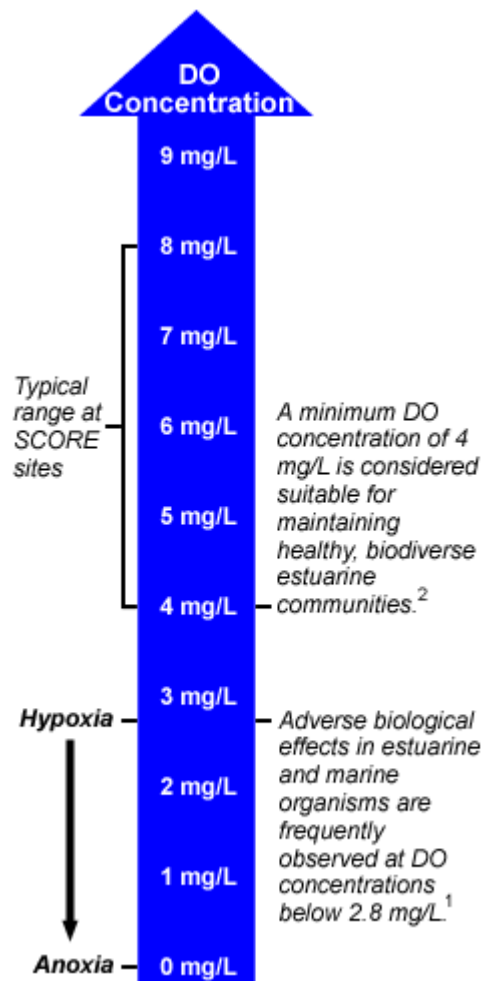
## DISSOLVED OXYGEN PROTOCOL

### South Carolina (Nancy Hadley et al.)

DO is an important parameter used to assess water quality because it is required by most aquatic organisms for survival. It is needed for respiration and for the cycling of organic carbon between living and non-living matter (known as the carbon cycle). Therefore, it is important that a sufficient amount of DO be available in water, although too much oxygen can also be harmful to aquatic organisms. The concentration of DO measured in water is considered to be one of the best indicators of the health of an estuary.

When DO concentrations are too low, an estuary may not be able to support a healthy and diverse community of species. Organisms become stressed and may not be able to grow, feed, or reproduce properly. Sessile, or immobile, species such as oysters are especially at risk because they are unable to move from areas with low DO concentrations to areas with higher DO concentrations.

In South Carolina, a minimum DO concentration of 4 mg/L is considered suitable to sustain healthy and diverse estuarine communities.<sup>2</sup> DO concentrations below 2.8 mg/L are stressful to many estuarine and marine species and are considered hypoxic (low in oxygen)<sup>1</sup>, while DO concentrations of 0.0 mg/L do not support aquatic life are considered anoxic (without oxygen).



For volunteer use we have found that the Chemetrics test kit described below is safe, easy to use, and gives results which consistently correspond well to more sophisticated methods such as a dissolved oxygen meter.

### **Materials**

Chemetrics Dissolved Oxygen Kit K-7512 (Chemetrics, Inc. \$43 for 30 tests, refills \$21.50); plastic bottle for disposal; plastic beaker for sample collection; paper towel or soft cloth

### **Sample Collection**

The most important part of any dissolved oxygen test is sampling. A water sample should be obtained with minimal amount of mixing with air. Procure a water

sample with the provided plastic beaker. It is desirable to sample from below the surface at a depth of about 1 foot. Avoid splashing as you procure the sample.

### ***Test Procedure***

Caution: This test results in a sharp glass object which must be handled with care.

This is a colorimetric analysis in which a water sample is added to reagents and visually compared to color standards. Each color standard corresponds to a concentration of dissolved oxygen in parts per million (ppm, mg/L).

1. Open the oxygen kit and remove the 25 ml plastic cup. Gently submerge this in the beaker until it is full.
2. Remove the plastic ampoule “cracker” from the kit and place in the plastic cup.
3. Carefully remove a new oxygen ampoule from the storage box. The ampoule should contain a small amount of clear solution.
4. Place the ampoule pointed end down in the “cracker” (which is in the small plastic cup). Grip the handles of the cracker with two fingers and use the thumb to press on the base of the ampoule. (The action is similar to using a syringe). When the tip of the ampoule snaps, the ampoule will automatically fill with the correct amount of sample, leaving a small bubble of air in the ampoule.
5. Mix the contents of the ampoule thoroughly by gently inverting the tube and allowing the bubble to travel from end to end several times. Carefully wipe any liquid from the side of the ampoule and place it inside the oxygen kit. Close the lid and wait at least 2 minutes to allow reagents to fully react with oxygen in water sample. Dry the tube with the paper towel or cloth. (Be careful of the sharp end).
6. Standing directly beneath a bright source of light, hold the color comparator nearly horizontal and compare the ampoule with water sample to the color standards until the best color match is found. Do this by starting at the light colored (low DO) end of the comparator chart. Place the ampoule between the first two standards. If it is darker than the right hand standard, move it one position so that it is between standards two and three. Continue in this manner until the ampoule is not darker than the right hand standard. Decide whether the ampoule is closer to the standard on its left or right and record this number. If you cannot decide, record the average of the two numbers.



7. Store the used ampoule in the plastic disposal bottle. When full the entire bottle can be discarded in the municipal trash.
8. Replace all kit components, making sure the comparator chart is seated firmly in the box.