How to use…

Dissolved Oxygen Kit (Hach Model OX-2P)

INSTRUCTION SHEET

Testing Location - Field

This test must be performed in the field since any sample shaking, temperature change, or extended period of time will promote the release of oxygen, therefore altering the accuracy of the results.

Materials

2 Glass-stoppered water collection bottle
Dissolved oxygen 1, 2, & 3 reagent powder
Clippers or scissors
1 or 2 Plastic measuring tube
1 or 2 Square mixing bottle
Sodium thiosulfate standard solution with eyedropper

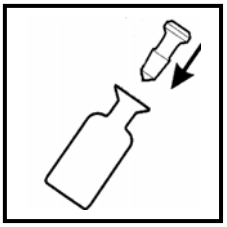
Testing Background

The goal of this test to determine the amount of dissolved oxygen in the water, not the amount of atmospheric oxygen that you allow to mix with the water. It is extremely critical to use precise sampling method techniques for this test, as any addition of air in the stages of opening and closing the collection bottle will dramatically affect the results. It is better to add some sample water to the dissolved oxygen bottle if not completely full rather than shaking the bottle with extra air.

This test involves a titration process – an analytical procedure for determining the reactive capacity of a solution. A titration involves adding a reagent in small portions of known volume (or drops) to a known volume of a solution being tested until a desired end point (color change) has occurred.

Test Instructions

1. Fill the dissolved oxygen bottle (round bottle with glass stopper) with the water to be tested by allowing the water to *overflow* the bottle. You want to displace all air space in the bottle with the water. To avoid trapping air bubbles in the bottle, incline the bottle slightly and quickly insert the stopper. This will force the air bubbles out. Check under the stopper to see if there are air bubbles. If none, proceed to the next step. If yes, overfill the bottle again and reinsert the stopper again until there are no bubbles.



2. Use the clippers or scissors to open one Dissolved Oxygen 1 Reagent Powder Pillow and one Dissolved Oxygen 2 Reagent Powder Pillow. Add the contents of each of the pillows to the bottle. Stopper the bottle carefully to exclude air bubbles. If air bubbles get trapped, add a little sample water to the bottle and re-stopper until there are no bubbles.

3. Grip the bottle and stopper firmly; shake vigorously to mix. A flocculent (floc) precipitate will be formed. If oxygen is present the precipitate will be brownish orange in color. A small amount of powdered reagent may remain stuck to the bottom of the bottle. This will not affect the test results.

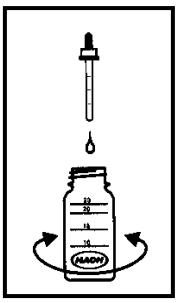
4. Allow the sample to stand until the floc has settled halfway down in the bottle, leaving the upper half of the sample clear. Shake the bottle again. Again let it stand until the upper half of the sample is clear. Note: the floc will not settle in samples with high concentrations of chloride (possibly

drinking water) but interference with the test results will not occur as long as the sample is allowed to stand for four or five minutes.

5. Use the clippers or scissors to open one Dissolved Oxygen 3 Reagent Powder Pillow. Remove the stopper from the bottle and add the contents of the pillow. Carefully re-stopper the bottle and shake to mix. Make sure there is no air bubble. Add the smallest amount of sample water necessary to rid any persistent bubbles. The floc will dissolve and a yellow color will develop if oxygen is present. Note: at this point the amount of DO in the sample is fixed, and if necessary, the sample can be transported back to the classroom for the remaining steps.

6. Fill the plastic measuring tube over the top with the yellow colored solution prepared in steps 1 through 5. Pour this measured out amount into the square-mixing bottle.
   Note: Do not discard the leftover sample from the large dissolved oxygen bottle; it may be needed later in the test.

7. It is time to titrate the sample. Using the eyedropper, add Sodium Thiosulfate Standard Solution drop by drop to the mixing bottle, *swirling* to mix after *each* drop. *Hold the dropper vertically (straight up and down – NOT AT AN ANGLE)* above the bottle and count each drop as it is added. Continue to add drops until the sample changes from yellow to colorless. To check to see if the solution truly is colorless, place the square mixing bottle on white paper or the white lid of the Dissolved Oxygen 3 Reagent Powder Pillow container. If not sure, add an additional drop to see if any further change occurred. If not, disregard your last drop. If any mistakes were made during step 7, go back to step 6.



8. Each drop used to bring about the color change in step 7 is equal to 1 mg/L of dissolved oxygen (DO). Record this value on the data sheet. Rinse all glassware with distilled water.

<u>If the results were less than or equal to 3 mg/L</u>: A more sensitive test must be conducted.

1. Take the prepared sample from step 5 and slowly and carefully pour it out until it reaches the white line midway on the dissolved oxygen bottle (30 mL line).

2. Add Sodium Thiosulfate Standard Solution drop by drop to this bottle. Hold the dropper vertically, counting each drop and swirling between each drop. Continue to add drops until the sample changes from yellow to colorless. Make sure it is colorless.

3. Each drop of Sodium Thiosulfate Standard Solution used to bring about a color change in the above step is equal to 0.2 mg/L dissolved oxygen (multiply the number of drops by 0.2). Record this value on your data sheet. Rinse all glassware with distilled water.

Disposal and Clean-up

Empty remaining sample and titration into a waste container to take back to the classroom. The waste from this test can be flushed down the sink with plenty of water. Rinse all dissolved oxygen glassware with distilled water.

Safety Precautions:

The chemicals can cause eye and skin irritation and are harmful if ingested. Aside from taking normal precautions when handling the bottles, read the labels on the packaging before beginning the test. Be sure to wash your hands after using the chemicals

This test sheet was adapted from the HACH Company (Loveland, Colorado) Dissolved Oxygen Test Kit Model OX-2P.