



## Test Kit Instructions for "Red Flag" Monitoring Volunteers

### Temperature

**1. Pour sample into small cup and insert thermometer.** Thermometer can also be submerged directly in the stream but is not recommended, particularly in swiftly moving waters.



**2. Wait 10-15 seconds for thermometer to stabilize, read temperature and record on field data sheet.**





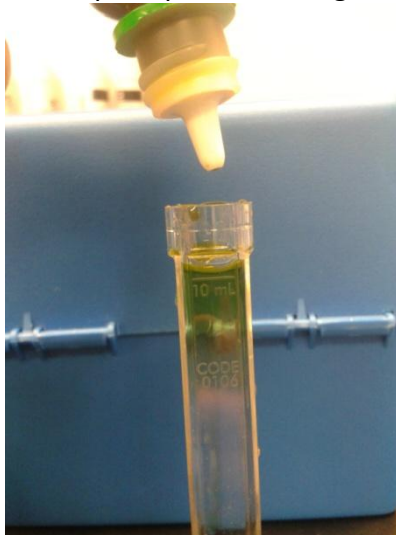
**pH (Kit Code 5858)**



**1. Fill test tube to 10 ml line with sample water.**



**2. Add 10 drops of pH Wide Range Indicator**





3. Insert test tube into the test tube reader, choose the color that matches best and record your result in the pH section of the field data sheet. If the color is in between two results, you can record an average of .25 or .75. In this example photo, the result is 7.25.





## Conductivity - Hanna Instruments HI 98303

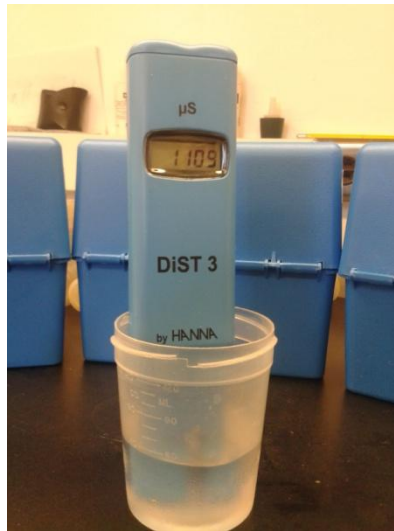


1. Pour approximately 20 ml of sample into a small wide-mouth container. Meter can also be submerged directly in the stream but is not recommended, particularly in swiftly moving waters.
2. Turn on the meter and submerge the probe in the sample. The probe does not need to be fully submerged.





3. Wait 10-15 seconds or until the meter stabilizes.



Some drifting ( $\pm 1-5 \mu\text{S}/\text{cm}$  or about 1%) can be expected. If the meter has not stabilized after 1 minute and has not drifted more than  $\pm 1\%$ , record the result in the middle of the drifting range.

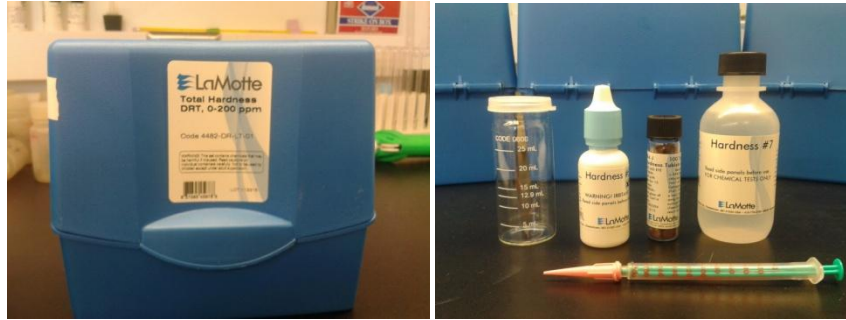
4. Record your result on your field data sheet.



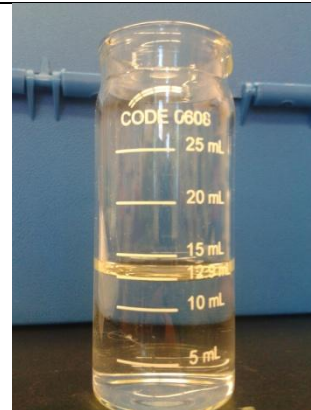
To calibrate the meter, place it in the known calibration solution and adjust accordingly with the provided yellow screwdriver.



### Total Hardness (Kit Code 4482-DR-LT)



1. Fill test tube to the 12.9 ml line with sample water.
2. Add five (5) drops of Hardness Reagent #5 and mix.
3. Add one (1) Hardness Reagent #6 tablet. Cap and swirl test tube until table dissolves. Solution will turn red if hardness is present. If solution is blue there is no hardness present.
4. Fill the titrator (plunger) with Hardness Reagent #7 and insert into the center hole of the test tube.



Step 1 - Fill to 12.9 ml line



Step 3 - Solution will turn red/pink if hardness is present (almost always)



Step 4 - Fill titrator so that the green ring is at the 0 line (shown)



5. While gently swirling the test tube, **slowly** press the plunger to add Hardness Reagent #7 one drop at a time until the red color changes to blue.

*\*Note\* Red color will turn purple before turning blue and this is a signal that you are approaching the endpoint and should slow down. Once the solution is blue, it will stay blue no matter how many additional drops you add. The blue color is deep blue, similar to the color of the test kit boxes. Holding the test tube up to natural light or a white piece of paper will help catch this color change. If you are unsure if you've reached the blue, take note of the reading on the titrator, add one more drop, and see if the color continues to change. If it doesn't change, use your original reading. If it continues to change, keep adding drops until you reach the blue endpoint.*

6. If you use all of the Hardness Reagent #7 in the plunger and the color change still has not happened, refill the titrator and continue the titration. When recording your result add 200 to your result to account for the first full titrator.

7. Read your result where the green ring touches the outside of the plunger.

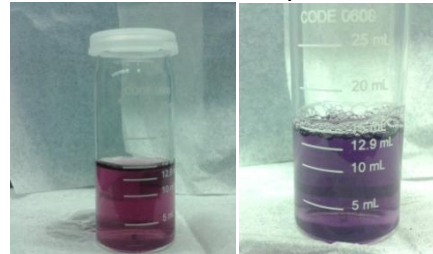


*In this picture, the result is 136 mg/L.*

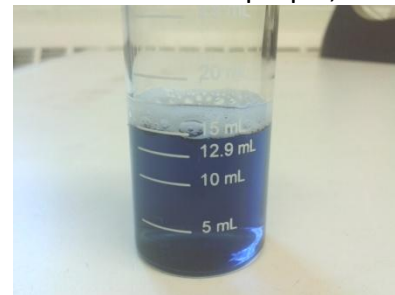
8. Record your result on your field data sheet under the Total Hardness section.



Step 5 - Add drops one at a time, swirling between each drop to mix.



This is not blue. This is purple, not blue.



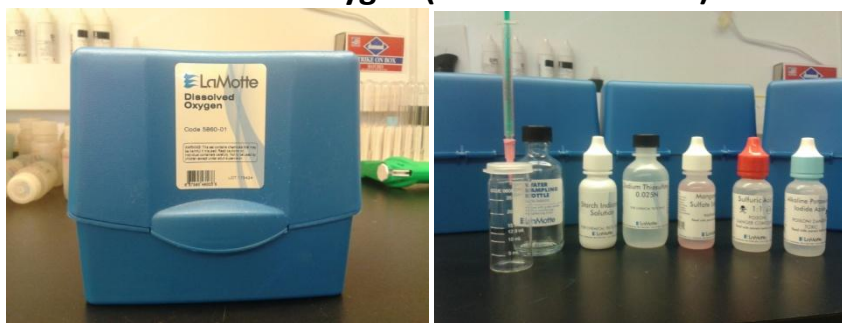
**BLUE - This is the endpoint**



Holding the test tube up to natural light will help show colors clearly - this is blue! It is a very similar color to the Lamotte box.



### Dissolved Oxygen (Kit Code 5860-01)



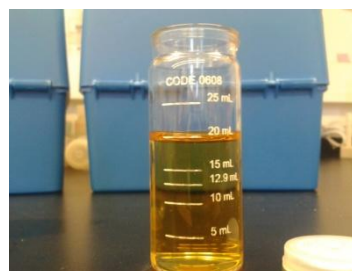
1. Fill water sampling bottle completely with no air bubbles. The easiest way to do this is to hold the bottle upright underwater and screw on the lid.
2. Add 8 drops of Manganous Sulfate Solution.
3. Immediately add 8 drops of Alkaline Potassium Iodide Azide.  
**\*Note\* At this point the sample has been "fixed" and the remainder of the test can be completed up to 8 hours later. These first two steps MUST take place immediately!**
4. Replace the cap and invert the bottle several times to mix the solutions. Allow the precipitate to settle below the shoulder of the bottle before continuing.
5. Add 8 drops of Sulfuric Acid.
6. Replace the cap and invert the bottle to mix until all of the precipitate has dissolved. This may take up to 30 minutes, especially when the water is cold.
7. Once the precipitate has completely dissolved, fill the test tube to the 20 ml line with your sample water and cap.



Step 4 - Wait until the precipitate has settled below the shoulder (shown on right) before adding the sulfuric acid



Step 6 - Invert the bottle until the precipitate has fully dissolved before adding to test tube.



Step 7 - pour 20 ml into test tube





8. Fill the titrator (plunger) with Sodium Thiosulfate solution so that the green ring is at the 0 line (shown below).



9. Add drops of Sodium Thiosulfate until the sample becomes pale yellow and place the titrator to the side. **Do not add or remove any more drops from the titrator - you will come back to this!**

10. Add 8 drops of Starch Indicator.

11. Continue adding drops of the Sodium Thiosulfate until the blue color just disappears and solution is colorless.

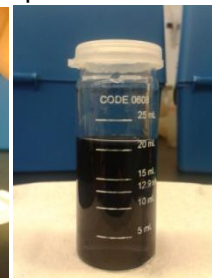
12. If you use all of the Sodium Thiosulfate in the plunger and the blue color is still present, refill the titrator and continue the titration. When recording your result add 10 to your result to account for the first full titrator.

13. Read your result where the green ring touches the outside of the plunger.

14. Record your result on the field data sheet in the Dissolved Oxygen section.



Step 9 - Add titrant one drop at a time until sample becomes pale yellow (check paint switch for accuracy)



Step 10 - Add starch Indicator. Sample will become dark blue or black.



Step 11 - Add titrant one drop at a time until solution becomes colorless.



Step 12 - Read the result from the titrator where the green ring touches the outside (7.0 in this picture)