

How to use...

# Orthophosphate Kit (Hach Model PO-19)

## INSTRUCTION SHEET



### Testing Location – Field or Laboratory

If the water sample is taken back to the laboratory or classroom, the phosphate test should be conducted within 24 hours for best results. Store samples in the refrigerator until testing.

### Testing Background

Phosphorus occurs in two forms: organic and inorganic phosphates ( $\text{PO}_4^-$ ). Our tests kits measure for inorganic phosphate (also known as orthophosphate, reactive phosphate, or free phosphate). Total phosphates (both inorganic and organic) are available, however, they are expensive and require using a heating apparatus.

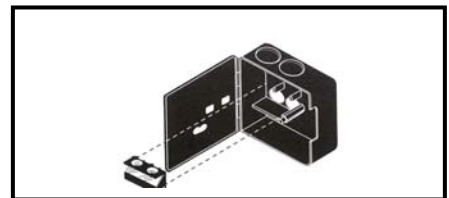
For our test kit, there is a low range (0-1 mg/L), mid range (0-5 mg/L; best for 1-5 mg/L), and high range (0-50 mg/L; best for 5-50 mg/L). Most schools will use the low range test and should start with those instructions below. If the high-range test is needed, refer to the instruction in the HACH kit.

### Materials

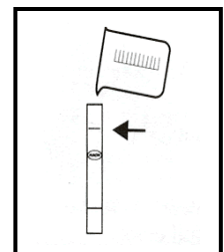
- PhosVer 3 Phosphate Reagent Powder Pillows
- Color comparator with viewing adapter (mirror) and blue shaded color disc
- 2 square mixing bottles
- 4 test tubes (plastic or glass) with stoppers

### Test Instructions – Low Range Test (0-1 mg/L) – START WITH THIS TEST RANGE

1. For both Sample A and Sample B: Fill the square bottle to the 20 mL mark with the sample water.
2. Add the contents of one PhosVer 3 Phosphate Reagent Powder pillow to the bottle and swirl (not shake) to mix. Allow at least eight but no more than ten minutes for full color development. If phosphate is present, a blue-violet color will develop. While you wait, proceed to step 3 and 4.
3. If not already done, place the Long Path Viewing Adapter (the little mirror holder) onto the shelf in the black comparator box with the mirror angled outward. Also insert the blue shaded color disc so that you can read the numbers through the slit on the front of the black comparator box.



4. With untreated sample water, fill a clean test tube to the top line (1 cm below the top). If it is a glass test tube, the line is labeled 1730; plastic test tubes have no label. Place this tube (with no stopper) in the outermost opening of the color comparator.
5. After eight minutes has elapsed, fill an empty test tube to the highest line (1 cm below the top) with the prepared sample from the square bottle. Place this tube



(with no stopper) in the central opening of the viewing comparator. Hold the comparator up to a light source (sky, window, or lamp) being careful not to spill the samples. View the test tubes through the openings on the front of the comparator box. Rotate the disc to obtain a color match.

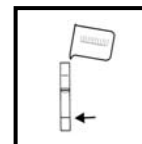
*Note: The color may be very faint or nonexistent. So if you are sure you followed the directions correctly, there just may not be any phosphate in the sample or the amount is too small for this test kit to detect.*

6. Read the concentration of the measured parameter through the scale window. Divide this number by 50 to obtain the mg/L phosphate ( $\text{PO}_4^{3-}$ ). Divide the phosphate value by 3 to obtain the value as mg/L phosphorus (P). [Total division is by 150 like done on the data sheet]. Record this value on the data sheet. Rinse all glassware with distilled water.

*Note: If the color developed is so dark as to be off the high end of the scale (greater than 1 mg/L phosphate or .33 mg/L phosphorus), proceed to the mid range (0-5 mg/L) test instructions.*

### **Test Instructions – Mid Range (0-5 mg/L; best used for 1-5 mg/L)**

1. Remove the Long Path Viewing Adapter (mirror) from the color comparator box.
2. With sample water, fill a clean *test tube* to the first line (5 mL) at the bottom.
3. Add the contents of one PhosVer 3 Phosphate Reagent Powder Pillow to the test tube. Swirl to mix. Wait at least one minute for full color development (blue-violet). You must make the color comparison within 5 minutes. This test tube (no stoppers) goes in the central opening of the color comparator box.
4. With untreated sample water, fill another clean test tube to the first line (5 mL) at the bottom. Place this test tube (no stoppers) in the outermost opening in the color comparator.
5. Hold the comparator up to a light source (sky, window, or lamp) being careful not to spill the samples. View the test tubes through the openings on the front of the comparator box. Rotate the disc to obtain a color match.
6. Read the concentration of the measured parameter through the scale window. Divide this number by 10 to obtain the mg/L phosphate ( $\text{PO}_4^{3-}$ ). Divide the phosphate value by 3 to obtain the value as mg/L phosphorus (P). [Total division is by 30 like done on the data sheet]. Record this value on the data sheet. Rinse all glassware with distilled water.



*Note: If the color developed is so dark as to be off the high end of the scale (greater than 5 mg/L phosphates or 1.66 mg/L phosphorus), use the high range (0-50 mg/L) test instructions in booklet supplied by Hach in the test kit.*

### **Disposal and Clean Up**

Empty remaining sample into a waste container to take back to the classroom. At school, the waste from this test can be flushed down the sink with plenty of water. Rinse all glassware with distilled water.

### **Safety Precautions:**

The chemical in this kit may be hazardous to the health and safety of the user if inappropriately handled. Please read the warning on the package before performing the test. Use appropriate safety equipment and normal precautions.

*This test sheet was adapted from the HACH Company (Loveland, Colorado) Orthophosphate Test Kit Model PO-19/PO-19A.*