

# Reactive Phosphorus



Phosphorus (P) is a nutrient that occurs naturally at low concentrations in water and it is essential for all forms of life. It comes from processes like the weathering of rocks and from the decomposition of organic matter such as plant litter. Phosphorus is present in streams as soluble phosphates, phosphorus bound to sediments and phosphates occurring in living organisms. Algae and aquatic plants quickly use up unattached or free phosphorus. Where there is an excessive amount of phosphorus in the water, algal blooms can be a serious problem. Increases in phosphorus levels in streams may result from erosion, discharge of sewage, detergents, urban stormwater and rural runoff containing fertilizers and animal and plant material.

There are different ways to test for phosphorus. In natural waters and wastewater, phosphorus is present in the form of phosphates almost always and is rarely found in its elemental form, P. The test we use is for total reactive phosphorus – which detects any form of P that reacts with reagents in a colorimetric test without prior filtering, or digestion (acid and heating). Total reactive phosphorus includes ortho-phosphates (i.e. simple inorganic forms of phosphates, namely  $\text{PO}_4^{3-}$ ,  $\text{HPO}_4^{2-}$ ,  $\text{H}_2\text{PO}_4^-$ , and  $\text{H}_3\text{PO}_4$ . These forms of P are most readily available for uptake by plants), as well as other easily hydrolysable organic and inorganic forms of P.

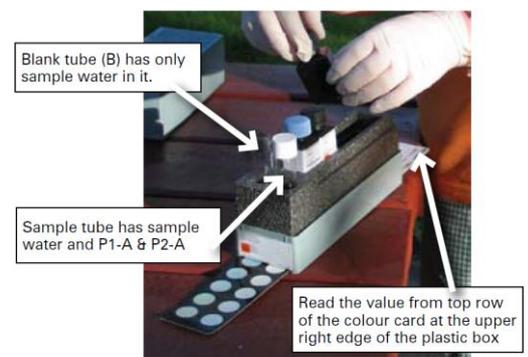
**Safety Glasses and Gloves must be worn!**

## Reactive Phosphorus using the Merck MColortest

Maintenance required: Ensure test tubes have been thoroughly washed (do not use a detergent containing phosphate) and rinsed with distilled water. Ensure the P-2A powder does not get damp; it will change colour and go lumpy – if this occurs contact Waterwatch for replacement.

You will need: Aquaquant Test kit (Merck), safety glasses and gloves. Keep the colour chart clean, dry and free from dirt.

1. Put on your safety glasses and gloves.
2. Open the pack and set up with both test tubes on the LEFT.
3. Pour **20mL** of stream water into both test tubes.
4. Add **5 drops** of Reagent PO4-1 into the sample tube A.
5. Add **one level** microspoon of reagent PO4-2 to sample tube A. Replace cap and shake to dissolve.
6. Leave solution to stand for **three minutes** to allow full colour development.
7. Unfold the colour card and introduce it coloured end first into the slit at the lower RIGHT edge of the plastic box.
8. Slide the colour card through to the left until the closest possible colour match is achieved between the two open tubes viewed from above.
9. Read the value from top row of the colour card at the upper right edge of the plastic box. This is best read under direct sunlight.
10. Record the value in mg/L (black numbers on top row) in your Waterwatch monitoring results book.



This MColortest replaces the Aquaquant test for reactive phosphorus