Technical Specification

Tests For: Low Levels of Phosphate in Natural and Drinking Waters

Test Range: 0–4.0 mg/L PO_4

Reagent Chemistry Used: Ascorbic acid/molybdenum blue

Basis of Test Method: Standard Method 4500-P-E, US EPA Method 365.1, ISO9717:2017

Method Detection Limit*: 0.045 mg/L

Limit of Quantification**: 0.15 mg/L

*The Method Detection Limit (MDL) is defined as the minimum measured concentration of a substance that can be reported with 99% confidence to be different from the method blank results.[i]

**The Limit of Quantification (LOQ) is the smallest quantity that can be detected with reasonable certainty for a given analytical procedure. [ii]

Testing for Phosphate LR

Phosphates are extensively used in detergent formulations and washing powders. Phosphates also find widespread application in the food processing industry and in industrial water treatment processes. Agricultural fertilizers normally contain phosphate minerals and phosphates also arise from the breakdown of plant materials and in animal wastes.

Phosphates can therefore enter water courses through a variety of routes - particularly domestic and industrial effluents and run-off from agricultural land. Phosphate is an important control test for natural and drinking waters.

Whilst phosphates are not generally considered harmful for human consumption, they do exhibit a complex effect on the natural environment. In particular, phosphates are associated with eutrophication and with rapid unwanted plant growth in rivers and lakes. Phosphates present in natural water pass through into drinking water supplies.

The Palintest Phosphate LR test provides a simple method of measuring phosphate levels over the range 0–4 mg/l PO_4.

Reagent Chemistry

In the Palintest Phosphate LR method, the phosphate reacts under acid conditions with ammonium molybdate to form phospho-molybdic acid. This compound is reduced by ascorbic acid to form the intensely coloured ‘molybdenum blue’ complex. A catalyst is incorporated to ensure complete and rapid colour development, and an inhibitor is used to prevent interference from silica. The reagents are provided in the form of two tablets for maximum convenience. The test is simply carried out by adding one of each tablet to a sample of the water.

The intensity of the colour produced is proportional to the phosphate concentration and is measured using a Palintest Photometer.

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[i] EPA, Definition and Procedure for the Determination of the Method Detection Limit, Revision 2, Dec 2016.
[ii] *IUPAC. Compendium of Chemical Terminology, 2nd ed. (the "Gold Book").*