Scope
This method is used for the determination of orthophosphate in drinking water, surface water, and domestic and industrial wastes according to USEPA Method 365.1 and Standard Methods 4500–P F. This method can also be used for the determination of orthophosphate in saline water and potassium chloride (KCl) extracts of soils and plants. Additionally, this method enables orthophosphate analysis according to ISO method 15681–2.

Summary
Orthophosphate reacts with molybdenum(VI) and antimony(III) in an acidic solution to form an antimony-phosphomolybdate complex. This complex is subsequently reduced with ascorbic acid to form a blue color, and the absorbance is measured at 660 nm.

Interferences
Filter turbid samples prior to analysis. Samples containing iron, copper, or silicate at concentrations greater than 50, 10, and 10 mg/L, respectively, interfere with this assay. The salt error for 5–20% salt samples was less than 1%. Although often at low concentrations, arsenate can cause a positive interference. Samples with background absorbance at the analytical wavelength may interfere. Residual phosphate in the flow system components and from continuous phosphate analysis may interfere. Wash the system and glassware with diluted HCl to correct phosphate interferences.

Performance Specifications
Range: 0.01–2.0 mg/L
Throughput: 45 samples/hour
Precision (at 0.10 mg/L): <2% RSD
Precision (at 1.0 mg/L): <1% RSD
Method Detection Limit (MDL): 0.001 mg/L
Accuracy: 98.98%

Chemicals
Ammonium Molybdate Tetrahydrate, $(NH_4)_6Mo_7O_{24}•4H_2O$
Antimony Potassium Tartrate, $K(SbO)C_4H_4O_6•½H_2O$
Ascorbic Acid, $C_6H_8O_6$
Sodium Hydroxide, NaOH
Deionized (DI) Water, ASTM Type I or II

Selected Reference
Methods for the Determination of Inorganic Substances in Environmental Samples; EPA/600/R-93/100; U.S. Environmental Protection Agency, Office of Research and Development, Environmental Monitoring and Support Laboratory: Cincinnati, OH, 1993; Method 365.1.
Orthophosphate, USEPA by SFA

Method Abstract


Figures

Figure 1. Orthophosphate Calibration (0.01-2.0 ppm)
Method Abstract

Figure 2. Orthophosphate Calibration Curve (0.01–2.0 ppm)

Figure 3. Orthophosphate Method Detection Limit (at 0.01 ppm)

Figure 4. Orthophosphate Precision (at 0.10 ppm)
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Figure 5. Orthophosphate Precision (at 1.0 ppm)

Figure 6. Orthophosphate QC Sample Precision (ERA 0.914 ppm at 98.98%)
Figure 7. Orthophosphate Calibration Results (0.01–2.0 ppm)
### Table 1. Orthophosphate Method Data

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Calibrant 0.01 mg/L</th>
<th>Calibrant 0.1 mg/L</th>
<th>Calibrant 1.0 mg/L</th>
<th>ERA QC Standard 0.914 mg/L</th>
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