

Methods

Phosphorus occurs naturally in rock formations in the earth's crust, usually as phosphate. High phosphate concentrations in surface waters may indicate fertilizer runoff, domestic waste discharge, or the presence of industrial effluents or detergents. Although phosphates from these sources are usually poly-phosphates or organically bound, all will degrade to *ortho* or reactive phosphates with time.

Accurate measurement of phosphate residuals in boilers and cooling towers is vital for monitoring corrosion inhibitor levels. Both methods described below measure reactive phosphate, which will give a positive reaction prior to hydrolysis, and is usually termed *ortho-phosphate*.

The Vanadomolybdophosphoric Acid Method

References: ASTM D 515-82, Phosphorous in Water, Test Method C. APHA Standard Methods, 23rd ed., Method 4500-P C - 2005.

In test kits employing the vanadomolybdophosphoric acid method, phosphate reacts with ammonium molybdate under acid conditions and in the presence of vanadium to form a yellow-colored product. Results are expressed as ppm (mg/L) PO₄.

The Stannous Chloride Method

Reference: APHA Standard Methods, 23rd ed., Method 4500-P D - 2005.

Test kits employing this chemistry utilize a stannous chloride reduction. Phosphate reacts with ammonium molybdate and is then reduced by stannous chloride to form a blue complex. Results are expressed as ppm (mg/L) PO₄.



Visual Kits

Range: 0-1 & 1-10 ppm MDL: 0.05 ppm / Method: Stannous Chloride	
CHEMets Kit	Cat# K-8510
CHEMets Refill, 30 ampoules	R-8510
Activator Solution Pack, six 10 mL bottles, Shelf life 20 months	A-8500 ¹
Low Range Comparator 0, 0.1, 0.2, 0.3, 0.4, 0.6, 0.8, 1.0 ppm	C-8501
High Range Comparator 1, 2, 3, 4, 5, 6, 7, 8, 10 ppm	C-8510
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Low and High Range Comparators, Activator Solution, 25 mL sample cup, sample cup top and instructions.	

Range: 2-30 ppm MDL: 2 ppm / Method: Vanadomolybdophosphoric Acid	
CHEMets Kit	Cat# K-8530
CHEMets Refill, 30 ampoules	R-8515
Comparator 2, 4, 6, 8, 10, 15, 20, 30 ppm	C-8530
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Comparator, 25 mL sample cup and instructions.	

Range: 0-120 ppm MDL: 5 ppm / Method: Vanadomolybdophosphoric Acid	
CHEMets Kit	Cat# K-8515
CHEMets Refill, 30 ampoules	R-8515
Comparator 0, 10, 20, 30, 40, 60, 80, 100, 120 ppm	C-8515
Kit comes in a plastic case and contains everything needed to perform 30 tests: Refill, Comparator, 25 mL sample cup and instructions.	

Instructions and SDSs are posted on our website.
If no shelf life is listed for a product, then the shelf life is at least 1 year.

Range: 0-30 & 30-300 ppm MDL: 5 ppm / Method: Stannous Chloride	
VACUettes Kit	Cat# K-8510D
VACUettes Refill, 30 ampoules	R-8510D
Activator Solution Pack, six 10 mL bottles, Shelf life 20 months	A-8500 ¹
Low Range Comparator 0, 5, 7.5, 10, 15, 20, 25, 30 ppm	C-8501D
High Range Comparator 30, 60, 90, 120, 150, 175, 200, 250, 300 ppm	C-8510D
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, Activator Solution, dilutor snapper cup, sample cup top, micro test tube and instructions.	

Range: 0-60 & 60-600 ppm MDL: 10 ppm / Method: Stannous Chloride	
VACUettes Kit	Cat# K-8510A
VACUettes Refill, 30 ampoules	R-8510A
Activator Solution Pack, six 10 mL bottles, Shelf life 20 months	A-8500 ¹
Low Range Comparator 0, 10, 15, 20, 30, 40, 50, 60 ppm	C-8501A
High Range Comparator 60, 120, 180, 240, 300, 350, 400, 500, 600 ppm	C-8510A
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, Activator Solution, dilutor snapper cup, sample cup top, micro test tube and instructions.	

Range: 0-120 & 120-1200 ppm MDL: 20 ppm / Method: Stannous Chloride	
VACUettes Kit	Cat# K-8510B
VACUettes Refill, 30 ampoules	R-8510B
Activator Solution Pack, six 10 mL bottles, Shelf life 20 months	A-8500 ¹
Low Range Comparator 0, 20, 30, 40, 60, 80, 100, 120 ppm	C-8501B
High Range Comparator 120, 240, 360, 480, 600, 700, 800, 1000, 1200 ppm	C-8510B
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, Activator Solution, dilutor snapper cup, sample cup top, micro test tube and instructions.	

¹The accessory pack supplies enough solution to perform at least 200 tests.

Range: 0-1200 & 1200-12,000 ppm MDL: 200 ppm / Method: Stannous Chloride	
VACUettes Kit	Cat# K-8510C
VACUettes Refill, 30 ampoules	R-8510C
Activator Solution Pack, six 10 mL bottles, Shelf life 20 months	A-8500 ¹
Low Range Comparator 0, 200, 300, 400, 600, 800, 1000, 1200 ppm	C-8501C
High Range Comparator 1200, 2400, 3600, 4800, 6000, 7000, 8000, 10,000, 12,000 ppm	C-8510C
Kit comes in a plastic case and contains everything needed to perform 30 tests (except distilled water): Refill, Low and High Range Comparators, Activator Solution, dilutor snapper cup, sample cup top, micro test tube and instructions.	



Instrumental Kits

Multi-Analyte Photometers V-2000 / V-3000 (See page 14 for instrumental features)

Range: V-2000: 0-8.00 ppm; V-3000/Spec: 0-5.00 ppm Method: Stannous Chloride	
Vacu-vials Kit , Shelf life 20 months	Cat# K-8513
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, Activator Solution, 25 mL sample cup, sample cup top, ampoule blank and instructions.	

Range: 0-80.0 ppm Method: Vanadomolybdophosphoric Acid	
Vacu-vials Kit	Cat# K-8503
Kit comes in a cardboard box and contains everything needed to perform 30 tests: thirty ampoules, 25 mL sample cup, ampoule blank and instructions.	

Vacu-vials Kits require the use of a CHEMetrics Direct-Readout Photometer (photometers sold separately) or a spectrophotometer capable of accepting a 13 mm diameter round cell. See page 14 for details.

Components and Accessories

Description	Cat#
Sample Cup Pack, 25 mL (6 ea)	A-0013
Sample Cup Top Pack for 25 mL Cup (6 ea)	A-0014
Micro Test Tube Pack (10 ea)	A-0015
Dilutor Snapper Cup Pack (6 ea)	A-0018
Ampoule Blank Pack (5 ea)	A-0023
* Sample Zeroing Accessory Pack	A-0503

* For use when testing colored or turbid samples. See page 13 for details.

Instructions and SDSs are posted on our website.
If no shelf life is listed for a product, then the shelf life is at least 1 year.

