Phosphonate 30

Range(s): 0-30.0 ppm PO_4^{3-}, 0-31.5 ppm ATMP (Aminotri(methylenephosphonic Acid)), 0-32.6 ppm HEDP (1-Hydroxyethylidene-1, 1-diphosphonic Acid), 0-44.7 ppm HPA (Hydroxyphosphonoacetic Acid), 0-85.2 ppm PBTC (Phosphonobutane Tricarboxylic Acid)

taylor

Procedure

Note: **IMPORTANT** – Carefully read the User's Guide and safety information included with the SteriPEN before using.

Note: Glassware that has not been properly cleaned may contaminate the sample and affect test results. Clean glassware thoroughly before use with phosphate-free detergent (available in local stores); then rinse with Hydrochloric Acid 3N (R-0737) followed by DI Water (R-0833) or sample water.

Note: Turbidity in sample may cause inaccurate results. If source water is turbid, filtration is recommended. Boiler water should be filtered for turbidity prior to testing.

1. Turn on the Colorimeter.
2. Select a test menu (ALL TESTS, RECENT TESTS, or FAVORITES) containing Phosphonate 30 using ◀▶.
3. Select Phosphonate 30 using ▲▼; then press ENTER ⊙.
4. Select a chemical form (PO_4, ATMP, HEDP, HPA, or PBTC) for expression of test results using ▲▼.

Note: For phosphonates not listed, select PO_4.

5. Using the 5 mL syringe (part #6792), add exactly 5 mL of sample water to clean 50 mL dilution vial (part #6551).
6. Dilute sample to 50 mL mark with DI Water (R-0833); then cap and mix thoroughly.
7. Rinse once and fill a 25 mm sample cell to 10 mL mark with diluted sample; then cap and set aside. (This will be the blank.)
8. Using the .05 g dipper spoon, add 1 level dipper Phosphonate 30 - Reagent A to the remaining diluted sample (30 mL) in the dilution vial.
9. Cap and mix until all powder is dissolved.
10. Carefully fill 25 mL sample tube (part #9198) to 25 mL mark with diluted sample.
11. Remove lamp cover from SteriPEN UV Light (part #6656-RC).
12. Activate SteriPEN for a 90-second (1 L) UV treatment. See SteriPEN User's Guide.
13. Insert SteriPEN into the diluted sample. When the sensing pins reach the sample, the UV light will automatically turn on. The UV light automatically turns off after each treatment.
14. After the UV treatment, remove SteriPEN and swirl sample to mix.
15. Shake off the SteriPEN to remove water from the sensing pins, or blot dry with a soft, lint-free cloth.
16. Repeat steps 12-14.
17. After completing two, 90-second UV treatments, remove SteriPEN from 25 mL sample tube. Clean the lamp and sensing pins; then dry with a soft, lint-free cloth. Replace lamp cover.
18. Rinse and fill a second clean 25 mm sample cell to 10 mL mark with the UV-digested sample. (This will be the prepared sample.)
19. Using the .05 g dipper spoon, add 1 level dipper Phosphonate 30 - Reagent B to both sample cells (blank and prepared sample); then cap and swirl to dissolve powder.
20. Remove cap from both sample cells and add 1 mL Phosphonate 30 - Reagent C to each; then cap and swirl to mix for 30 seconds.
21. Select TIMER using ◀▶; then press ENTER ⊙.
22. Select START using ◀▶; then press ENTER ⊙. (A 5-minute [05:00] countdown will begin.)
23. Select EXIT using ◀▶; then press ENTER ⊙.
24. When the timer beeps, insert blank sample cell into sample cell compartment. Align marks per User's Manual.
25. Select ZERO using ◀▶; then press ENTER ⊙. Zero will be displayed.
26. Remove blank sample cell from sample cell compartment.
27. Insert the second sample cell into sample cell compartment. Align marks.
28. Select READ using ◀▶; then press ENTER ⊙. The instrument will read the sample and the result will be displayed.
29. To express PO_4^{3-} in terms of a specific phosphonate, multiply result by the appropriate conversion factor provided in the following table:

Phosphonate Type	Conversion Factor
DETPMPA	1.207
EDTMPA	1.148
HEDP	1.085
HMDTMPA	1.295
HPA	1.49
NTP (ATMP)	1.050
PBTC	2.84

(over)

Interferences

Nitrite > 200 ppm – negative interference
Thiourea > 5 ppm – negative interference

The following analytes were tested to the levels listed below and found not to cause any interference up to the specified value:

Alkalinity, Total ($CaCO_3$) – 1000 ppm
Aluminum – 80 ppm
Azole (BT) – 50 ppm
Azole (TT) – 50 ppm
Chloride – 1000 ppm
Chromate – 100 ppm
Copper – 100 ppm
EDTA – 80 ppm
Fluoride – 10 ppm
Hardness, Calcium ($CaCO_3$) – 1000 ppm
Iron, Ferric – 10 ppm
Iron, Ferrous – 10 ppm
Molybdate – 20 ppm
Nitrate – 2000 ppm
Phosphate – 8 ppm
Polymer – 60 ppm
Polyphosphate – 20 ppm
Sulfate – 2000 ppm
Sulfite – 100 ppm
Zinc – 5 ppm

Test Method

Persulfate-UV Oxidation

In the presence of persulfate and UV radiation, phosphonate is converted to phosphate. Under acidic conditions, phosphate reacts with molybdate to form a heteropoly acid, which is reduced with ascorbic acid to form an intense blue color proportional to the concentration of phosphate, and therefore phosphonate, in a sample.

Estimated Detection Limit

0.2 ppm PO_4^{3-}

Precision

Using a single lot of reagent and a 1.5 ppm PO_4^{3-} standard, an individual analyst obtained a standard deviation of ± 0.1 ppm PO_4^{3-}.

Application

Industrial Water

Ordering Info

Reagent Pack

K-8014 Phosphonate 30
Formulated for exclusive use with Taylor's TTi® Colorimeter.

Reagent Pack Components

R-8014A Phosphonate 30 - Reagent A
R-8014B Phosphonate 30 - Reagent B
R-8014C Phosphonate 30 - Reagent C

Required Reagents & Accessories

R-0833 DI Water
#6382* Batteries, AA (lithium), 4-count
#6551** Vial, Dilution (50 mL), w/ cap
#6656-RC* UV Light, SteriPEN®, Rechargeable
#6792* Syringe, 5 mL, plastic
#9198* Sample Tube, Graduated (25 mL) w/ cap, plastic

Optional Reagents & Accessories

R-0737 Hydrochloric Acid 3N

* Included in K-8014-AC
** Included with M-3000

taylor
31 Loveton Circle, Sparks, MD 21152 USA
800-TEST KIT (837-8548) • 410-472-4340
customerservice@taylortechnologies.com

071720