Instruction #5853

(Staylor)

Colorimeter Series

Phosphonate 30 Range(s): 0-30.0 ppm PO₄³⁻, 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)

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.
- Turn on the Colorimeter.
- Select a test menu (ALL TESTS, RECENT TESTS, or 2. FAVORITES) containing Phosphonate 30 using
- Select Phosphonate 30 using $\blacktriangle \nabla$; then press ENTER \bigcirc . 3.
- Select a chemical form (PO₄, ATMP, HEDP, HPA, or 4. PBTC) for expression of test results using $\blacktriangle \nabla$.
- 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).
- Dilute sample to 50 mL mark with DI Water (R-0833); then 6. 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 ④.
- 22. Select START using \triangleleft ; then press ENTER \bigcirc . (A 5-minute [05:00] countdown will begin.)
- 23. Select EXIT using ◀▶; then press ENTER ④.
- 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

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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 Sulfate – 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 31 Loveton Circle, Sparks, MD 21152 USA \$300-TEST KIT (837-8548) • 410-472-4340	
071720			customerservice@taylortechnologies.com	