

Taylor's Phosphonate Test Kits

INTRODUCTION

Phosphonates (also known as organophosphates and phosphonic acids) find wide application in **industrial water treatment** because of their ability to inhibit scale, sequester undesirable metals, control corrosion, and disperse particulate matter. For example, phosphonates are commonly used in cooling tower water treatment, boiler water treatment, boiler cleaning, industrial cleaning product formulations, vehicle wash formulations, and the manufacture of textiles and paper pulp.

With Taylor's K-1583, ATMP (Aminotri(methylenephosphonic acid)) and five other phosphonates (Na_5ATMP , HEDP, K_6HDTMP , DTPMP, Na_5DTPMP) may be determined titrimetrically using thorium nitrate and xylenol orange indicator. **Fluoride is masked** in the procedure to prevent interference. As with all titrations, the reading is taken at the first permanent color change, which in this case is a purplish pink endpoint.

Our most recent test, K-1584, is a drop-count titration that employs chrome azurol S indicator instead of XO indicator. At the appropriate pH for the reaction, the addition of thorium nitrate titrating solution produces a distinct peach-to-purple color change at the endpoint. **This test is appropriate for nonfluoridated process cooling waters that contain PBTC** in the chemical treatment blend. Conversion factors also are provided for ATMP, Na_5ATMP , HEDP, and HPA.

Note: Iron causes negative interference with the XO method, positive with the CAS method. With either method, orthophosphate and polyphosphate can cause positive interference; fluoride is an additional positive interference for the CAS method.

PHOSPHONATE KITS

K-1583

Drop test (using pH test paper 1.8–3.8 for pH adjustment);
1 drop = 1 ppm ATMP

K-1584

Drop test (using pH test paper 2.5–4.50 for pH adjustment);
1 drop = 0.8 ppm PBTC



Taylor's K-1583 will perform 140 tests at 10 ppm ATMP. Note picture guide to color change at endpoint in instructions.

USER BENEFITS

- Drop-test **kits** contain all necessary reagents and equipment.
- Titrations do not require the ability to match colors, only the ability to see the **permanent color change** at the endpoint of the reaction.
- Drop-test kits are practical for both **on- and off-site** testing.
- **Waterproof instructions** are printed on plastic-impregnated paper that resists fading and tearing.
- **Picture guides** to color transitions in the test reassure new users.
- Custom-molded, durable plastic cases provide **safe storage** for all tests.
- **Proven chemistries** are based on *Standard Methods for the Examination of Water and Wastewater*, APHA, Washington, DC, and/or *American Society for Testing and Materials*, ASTM, Philadelphia, PA. Some methods use proprietary chemistry developed by Taylor Technologies.



the most trusted name in water testing

Taylor Technologies, Inc.
410-472-4340
800-TEST KIT (837-8548)
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ISO 9001:2008 Certified

ALSO AVAILABLE

- A wide array of single- and multiparameter kits featuring color-matching and/or drop-count tests.
- Taylor's TTI® Colorimeter (M-3000); test 30+ parameters commonly encountered in commercial and industrial settings and transfer results to a PC database.
- Myron L Company portable instruments and calibration solutions (sold separately in reagent packs).
- Testing supplies and kit replacement parts (e.g., burets, flasks, test tubes, and test cells).
- **Video demonstrations** for new users posted on our website.
- Toll-free technical assistance at **800-TEST KIT**.

REPRESENTATIVE TEST PROCEDURE

Reproduced from K-1583 instruction:


DROP TEST		Instr. #5051
PHOSPHONATE EQUIVALENCE (PPM) ATMP (1.0); Na ₅ ATMP (1.3); HEDP (0.9); K ₆ HDTMP (1.2); DTPMP (1.45), Na ₅ DTPMP (1.7)		
COMPONENTS:		
1 x 5051	Instruction	
1 x 9198P	Sample Tube, Graduated (25 mL) w/ cap & purple dot, plastic	
1 x 9315	Test Paper, pH, 1.8-3.8, 200 strips	
1 x R-0686P-C	Sulfuric Acid N, 2 oz w/ purple cap, DB	
1 x R-0697-C	Thiosulfate N/10, 2 oz, DB	
1 x R-0802P-I	Xylenol Orange Indicator Powder, 10 g	
1 x R-0803-C	Phosphonate Titrating Solution, 2 oz, DB	
1 x R-0805-C	Fluoride Masking Agent, 2 oz, DB	
TO ORDER REPLACEMENT PARTS AND REAGENTS CALL TOLL-FREE 800-TEST KIT (800-837-8548).		
PROCEDURE:		
CAREFULLY READ AND FOLLOW PRECAUTIONS ON REAGENT LABELS. KEEP REAGENTS AWAY FROM CHILDREN.		
NOTE: When dispensing reagents from dropper bottles, always hold bottle in a vertical position.		
NOTE: Iron can cause negative interference at a level greater than 5 ppm. Orthophosphate and polyphosphate can cause positive interference at all levels.		
NOTE: Run a blank using tap water. Normal blank requires about 2 drops of R-0803 Phosphonate Titrating Solution to reach endpoint.		
Phosphonate Test		
1. Rinse and fill 25 mL sample tube (#9198P) to 25 mL mark with water to be tested.		
2. Add:		
1 drop R-0697 Thiosulfate N/10		
10 drops R-0805 Fluoride Masking Agent		
1 level dipper R-0802P Xylenol Orange Indicator Powder		
Swirl to mix.		
3. Adjust pH between 2.6 and 3.0:		
Add 1 drop R-0686P Sulfuric Acid N. Swirl to mix. Dip test paper (#9315) into sample, in direction of arrow, for 3 seconds, with all color zones immersed. Match indicator zone (unnumbered square between 2.7 and 3.0 color standards) with color scale. Read printed pH value. If necessary, continue adding R-0686P Sulfuric Acid N dropwise, swirling and checking pH with a new test paper after each drop, until a pH between 2.6 and 3.0 is obtained. Sample will be yellow (Fig. 1).		
4. Add R-0803 Phosphonate Titrating Solution dropwise, swirling and counting after each drop, until color changes from yellow to purplish pink (Fig. 2).		
5. Subtract drops of R-0803 Phosphonate Titrating Solution in blank from drops in sample (Step 4). Multiply by appropriate conversion factor (see CONVERSION FACTORS). Record as parts per million (ppm) phosphonate.		
CONVERSION FACTORS:		
To express phosphonate as:		Multiply drops by:
Aminotri(methylenephosphonic acid) (ATMP)		1.0
Aminotri(methylenephosphonic acid), pentasodium salt (Na ₅ ATMP)		1.3
1-Hydroxyethylidene-1,1-diphosphonic acid (HEDP)		0.9
Hexamethylenediaminetetra (methylenephosphonic acid), hexapotassium salt (K ₆ HDTMP)		1.2
Diethylenetriaminepenta (methylenephosphonic acid) (DTPMP)		1.45
Diethylenetriaminepenta (methylenephosphonic acid), pentasodium salt (Na ₅ DTPMP)		1.7
		
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Fig. 1

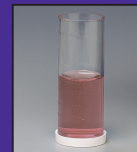


Fig. 2