

Flow Solution™ FS 3700 Automated Chemistry Analyzer

Total Phosphorus by Segmented Flow Analysis (SFA), USEPA 365.4

Cartridge Part Number 331380CT (SFA)
Channel Part Number 331379

Scope and Application

This method is used for the determination of total phosphorus (TP) in drinking water, surface water, and domestic and industrial wastes, in accordance with **USEPA method 365.4**.²

Method Performance

Range	0.010 mg/L - 20 mg/L P
Rate	60 samples/hour
Precision	> 2 %RSD at mid-range
Method Detection Limit (MDL)	0.0012 mg/L P

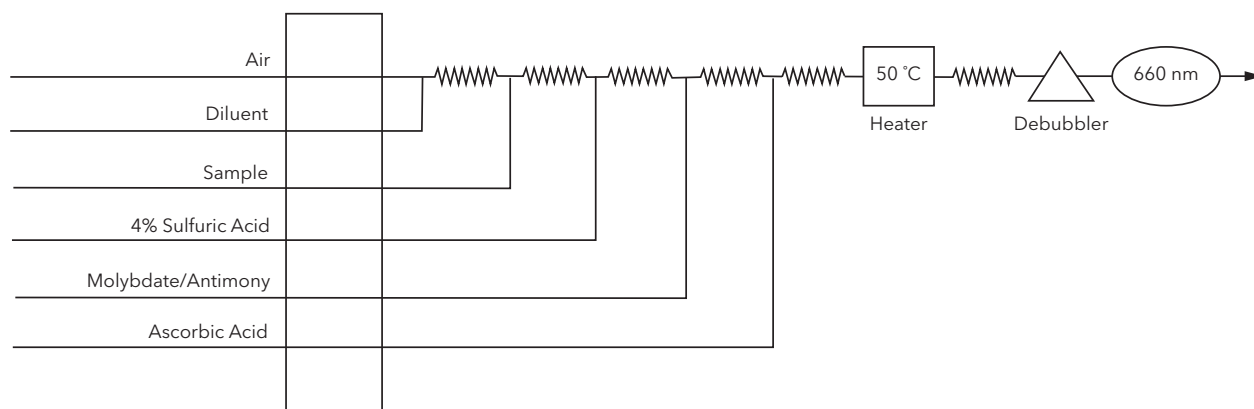


Figure 1. General Flow Diagram for Total Phosphorus, USEPA 365.4 by SFA

Reagents and Calibrants

Chemical Name	CAS#	Chemical Formula	Part Number
Ammonium molybdate tetrahydrate	12054-85-2	$(\text{NH}_4)_6\text{Mo}_7\text{O}_{24} \cdot 4\text{H}_2\text{O}$	
Potassium antimonyl tartrate trihydrate	28300-74-5	$\text{K}(\text{SbO})\text{C}_4\text{H}_4\text{O}_6 \cdot \frac{1}{2}\text{H}_2\text{O}$	
Ascorbic acid	50-81-7	$\text{C}_6\text{H}_8\text{O}_6$	
Copper sulfate pentahydrate	7758-99-8	$\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$	
DOWFAX® 2A1	12626-49-2		328852
Hydrochloric acid, concentrated	7647-01-0	HCl	
Potassium phosphate monobasic	7778-77-0	KH_2PO_4	
Potassium sulfate	7778-80-5	K_2SO_4	
Red mercuric oxide	21908-53-2	HgO	
Sodium chloride	7647-14-5	NaCl	
Sodium hydroxide	1310-73-2	NaOH	
Sulfuric acid, concentrated	7664-93-9	H_2SO_4	
Water, deionized,		H_2O	

Summary of USEPA Method 365.4²

Method

Prior to analysis, samples are digested via Kjeldahl digestion to hydrolyze phosphorus to orthophosphate. Orthophosphate reacts with molybdenum (VI) and antimony (III) in an acidic solution to form an antimonyphosphomolybdate complex. Ascorbic acid reduces this complex to form a blue color, and the absorbance is measured at 660 nm².

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.
- Samples with background absorbance at the analytical wavelength may interfere.
- Residual reacted phosphate in the flow system components and from continuous phosphate analysis may interfere. Wash the system and glassware with 0.1 N HCl to correct phosphate interferences; refer to "Appendix A - Prep Guide".
- Other compatible procedures for removing or suppressing interferences may be used, provided they do not adversely affect overall method performance.
- Method interferences can be caused by contaminants in the reagents, reagent water, and glassware, which may bias the results. Take care to keep all such items free of contaminants.

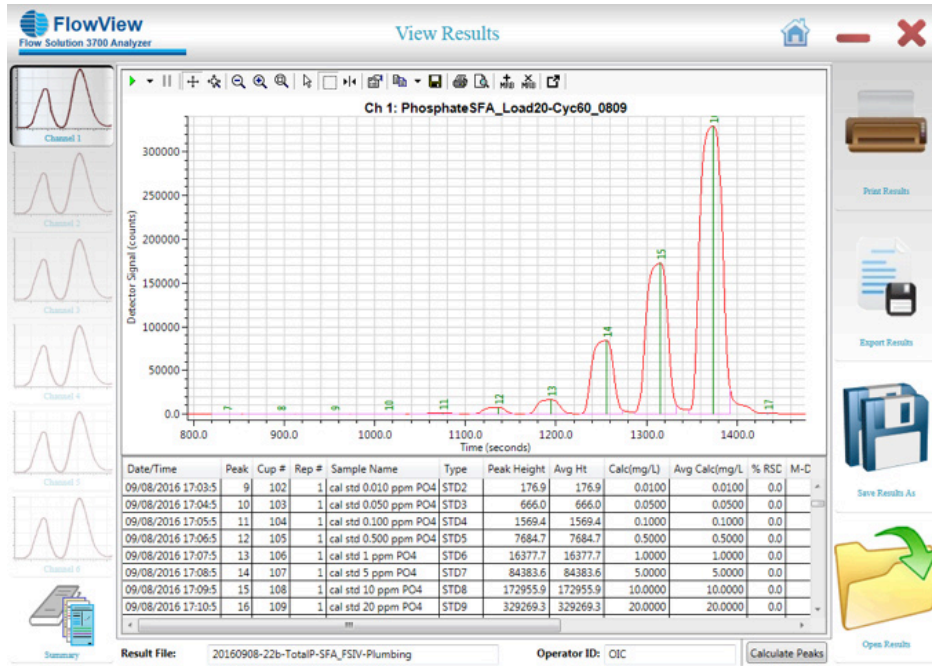


Figure 2. Total Phosphorus Calibration Series

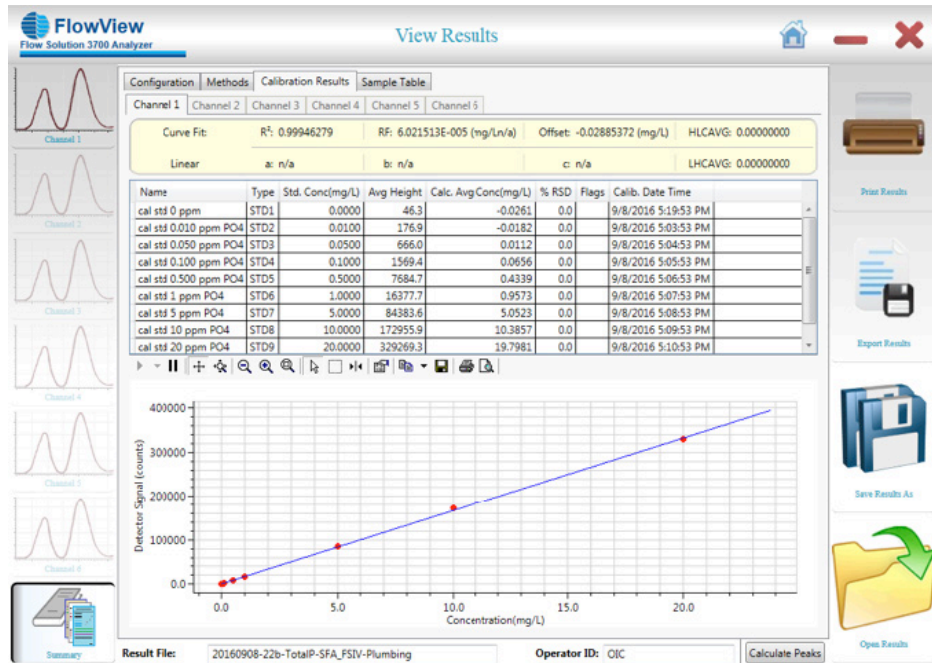


Figure 3. Calibration Curve and Statistics

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