Supelco®

1.17942.0001

Reflectoquant® plus Phosphate Test

PO_4^{3-}

1. Method

In sulfuric solution orthophosphate ions (PO_4^{3-}) react with molybdate ions to form molybdophosphoric acid. This is reduced to phosphomolybdenum blue (PMB) that is then determined reflectometrically.

2. Measuring range and number of determinations

Measuring range [1]	Number of determinations
0.1 - 5.0 mg/l PO_4^{3-} **0.03 - 1.63 mg/l PO_4-P** **0.075 - 3.74 mg/l P_2O_5**	100

[1] for conversion factors see section 8

3. Applications

This test measures only orthophosphate. Samples must be decomposed by digestion before total phosphorus can be measured (see section 6).

Sample material:
Groundwater, drinking water, and surface water
Wastewater
Seawater
Aquarium water
Soils and fertilizers after appropriate sample pretreatment
Food after appropriate sample pretreatment

4. Influence of foreign substances

This was checked individually in solutions with 2 and 0 mg/l PO_4^{3-}. The determination is not yet interfered with up to the concentrations of foreign substances given in the table. Cumulative effects were not checked; such effects can, however, not be excluded.

Concentrations of foreign substances in mg/l or %							
Acetate	1000	CN^-	1000	Ni^{2+}	100	NaCl	5 %
Al^{3+}	1000	CO_3^{2-}	1000	NO_2^-	1000	Na_2SO_4	10 %
Ascorbate	1000	**Cu^{2+}**	**10**	NO_3^-	1000		
BO_3^{3-}	1000	Fe^{2+}	1000	SO_3^{2-}	1000		
Br^-	1000	Fe^{3+}	1000	Tartrate	1000		
Ca^{2+}	1000	K^+	1000	Zn^{2+}	1000		
Citrate	1000	Mg^{2+}	1000				
Cl^-	1000	Mn^{2+}	1000				

5. Reagents and auxiliaries

Please note the warnings on the packaging materials!

The reagents in the test are stable up to the date stated on the pack when stored closed at +15 to +25 °C.

Package contents:
1 bottle of reagent PO_4-1
1 bottle of reagent PO_4-2
2 test vessels with stoppers
2 suction pipettes
1 bar-code strip

Other reagents and accessories:
Spectroquant® Crack Set 10C, Cat. No. 114688
+ thermoreactor
or
Spectroquant® Crack Set 10, Cat. No. 114687
+ empty cells 16 mm with screw caps (25 pcs), Cat. No. 114724
+ thermoreactor
Reflectoquant® Phosphate Test, Cat. No. 116978, measuring range 5 - 120 mg/l PO_4^{3-} (3.6 - 39.1 mg/l PO_4-P)
MQuant® Universal indicator strips pH 0 - 14, Cat. No. 109535
Sodium hydroxide solution 1 mol/l Titripur®, Cat. No. 109137
Sulfuric acid 0.5 mol/l Titripur®, Cat. No. 109072
Phosphate standard solution Certipur®, 1000 mg/l PO_4^{3-}, Cat. No. 119898

Empty cells for RQflex® plus (100 pcs), Cat. No. 116727

6. Preparation

- Extract solid sample materials by an appropriate method.
- Total phosphorus can be determined after pretreatment of the sample using one of the Spectroquant® Crack Sets.
- Check the phosphate content with the Reflectoquant® Phosphate Test. Samples containing more than 5.0 mg/l PO_4^{3-} must be diluted with distilled water **prior to** digestion.
- **The pH must be within the range 5 - 8.** Adjust, if necessary, with sodium hydroxide solution or sulfuric acid.
- Filter turbid samples.

7. Procedure

Observe the manual for the RQflex® plus reflectometer.
The following applies to the Phosphate Test:
Measurement procedure E (for cell measurement)
Stored reaction time: 5 sec

Rinse both test vessels several times with the pretreated sample.

	Measurement sample	**Blank** (only 1x per series)	
Pretreated sample (**20 - 30 °C**)	5 ml	5 ml	Fill the test vessel to the 5-ml mark.
Reagent PO_4-1	5 drops [1]	-	**Carefully** add and mix.
Reagent PO_4-2	1 level blue microspoon (in the cap of the PO_4-2 bottle)	-	Add, close the vessel, and swirl **until the reagent is completely dissolved**.

Pipette the measurement sample and the blank into two separate cells by means of two suction pipettes. In doing so, always fill **both** compartments of each cell to the upper limit of the transparent area.

Place the cell with the blank into the cell adapter, close the lid, and press the START button of the reflectometer.

As soon as required on the display, place the cell with the sample into the cell adapter, close the lid, and press the START button anew.

After the end of the reaction time, read off the result from the display in mg/l PO_4^{3-}.
The result is automatically stored.

[1] **Hold the bottle vertically while adding the reagent!**

Notes on the measurement:

- **Immediately after the measurement, remove the cell from the cell adapter.**
- For measurement the cells must be clean. Wipe, if necessary, with a clean dry cloth.
- Measurement of turbid solutions yields false-high readings.
- If the measurement value exceeds the measuring range (HI is shown on the display), repeat the measurement using **fresh**, diluted samples until a value of less than 5.0 mg/l PO_4^{3-} is obtained.

  Concerning the result of the analysis, the dilution (see also section 6) must be taken into account:

Result of analysis = measurement value x dilution factor

8. Conversions

required / given	mg/l PO_4^{3-}	mg/l PO_4-P	mg/l P_2O_5
1 mg/l PO_4^{3-}	1	0.326	0.747
1 mg/l PO_4-P	3.07	1	2.29
1 mg/l P_2O_5	1.34	0.436	1

9. Method control

To check test reagents, measurement device, and handling (recommended before each measurement series):
Dilute the phosphate standard solution with distilled water to 1.0 mg/l PO_4^{3-} and analyze as described in section 7.
Additional notes see under **www.qa-test-kits.com**.

10. Notes

- Reclose the reagent bottles immediately after use.
- Rinse the test vessels, suction pipettes, and cells **with distilled water only**.

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