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Dibasic Potassium Phosphate

K_2HPO_4 174.18
Phosphoric acid, dipotassium salt;
Dipotassium hydrogen phosphate CAS RN®: 7758-11-4.

DEFINITION
Dibasic Potassium Phosphate contains NLT 98.0% and NMT 100.5% of K_2HPO_4, calculated on the dried basis.

IDENTIFICATION
- **A. Identification Tests—General, *Potassium* ⟨191⟩**
  Sample solution: 1 in 20
  Acceptance criteria: Meets the requirements
- **B. Identification Tests—General, *Phosphate* ⟨191⟩**
  Sample solution: 1 in 20
  Acceptance criteria: Meets the requirements

ASSAY
- **Procedure**
  Sample: 5.2 g
  Sample solution: Transfer the *Sample* to a 250-mL beaker. Add 50 mL of water and 40.0 mL of 1 N hydrochloric acid, and stir until dissolved.
  Blank: Transfer 40.0 mL of 1 N hydrochloric acid to a 250-mL beaker. Add 50 mL of water.
  Analysis: Titrate the *Blank* potentiometrically with 1 N sodium hydroxide VS, and record the volume of 1 N sodium hydroxide VS consumed. Titrate the excess acid in the *Sample solution* potentiometrically with 1 N sodium hydroxide VS to the inflection point at pH 4, and record the buret reading. Subtract this buret reading from that of the blank, and designate the volume of 1 N sodium hydroxide VS resulting from this subtraction as *A*. Continue the titration with 1 N sodium hydroxide VS to the inflection point at pH 8.8, record the buret reading, and calculate the volume (*B*) of 1 N sodium hydroxide required in the titration between the two inflection points (pH 4–8.8). Where *A* is equal to or less than *B*, each mL of the volume *A* of 1 N sodium hydroxide is equivalent to 174.2 mg of K_2HPO_4. Where *A* is greater than *B*, each mL of the volume $2B - A$ of 1 N sodium hydroxide is equivalent to 174.2 mg of K_2HPO_4.
  Acceptance criteria: 98.0%–100.5% on the dried basis

IMPURITIES
- **Insoluble Substances**
  Sample solution: Dissolve 10 g in 100 mL of hot water.
  Analysis: Filter the *Sample solution* through a tared filtering crucible, wash the insoluble residue with hot water, and dry at 105° for 2 h.
  Acceptance criteria: The weight of the residue is NMT 20 mg (NMT 0.2%).
- **Carbonate**
  Sample: 1 g
  Analysis: Add 3 mL of water and 2 mL of 3 N hydrochloric acid to the *Sample*.
  Acceptance criteria: NMT a few bubbles are evolved.
- **Chloride and Sulfate, *Chloride* ⟨221⟩**
  Sample: 1.0 g
  Acceptance criteria: Shows no more chloride than corresponds to 0.40 mL of 0.020 N hydrochloric acid (NMT 0.03%)
- **Chloride and Sulfate, *Sulfate* ⟨221⟩**
  Sample: 0.20 g
  Acceptance criteria: Shows no more sulfate than corresponds to 0.20 mL of 0.020 N sulfuric acid (NMT 0.1%)

Change to read:

• ▲**Arsenic** ⟨211⟩, *Procedures, Procedure 1*▲ (CN 1-Jun-2023) **:** NMT 3 ppm

Change to read:

• **Iron**

Sample solution: Dissolve 0.33 g in 10 mL of water.

Analysis: To the *Sample solution* add 6 mL of hydroxylamine hydrochloride solution (1 in 10) and 4 mL of orthophenanthroline solution prepared by dissolving 1 g of orthophenanthroline in 1000 mL of water containing 1 mL of 3 N hydrochloric acid, and dilute with water to 25 mL.

Acceptance criteria: Any red color produced within 1 h is not darker than that of a control prepared from 1 mL of *Standard Iron Solution* (see ▲*Iron* ⟨241⟩, *Procedures, Procedure 1*▲ (CN 1-Jun-2023)): NMT 30 ppm.

• **Sodium:** A solution (1 in 10) tested on a platinum wire imparts no pronounced yellow color to a nonluminous flame.

• **Limit of Fluoride**

[Note—Prepare and store all solutions in plastic containers.]

Buffer: 294 g/L of sodium citrate dihydrate in water

Standard stock solution: 1.1052 mg/mL of USP Sodium Fluoride RS in water

Standard solution: Transfer 20.0 mL of *Standard stock solution* to a 100-mL volumetric flask containing 50.0 mL of *Buffer*, and dilute with water to volume. Each mL of this solution contains 100 µg of fluoride ion.

Sample: 2.0 g

Electrode system: Use a fluoride-specific ion-indicating electrode and a silver–silver chloride reference electrode connected to a pH meter capable of measuring potentials with a minimum reproducibility of ±0.2 mV (see *pH* ⟨791⟩).

Standard response line: Transfer 50.0 mL of *Buffer* and 2.0 mL of hydrochloric acid to a beaker, and add water to make 100 mL. Add a plastic-coated stirring bar, insert the electrodes into the solution, stir for 15 min, and read the potential, in mV. Continue stirring, and at 5-min intervals add 100, 100, 300, and 500 µL of *Standard solution*, reading the potential 5 min after each addition. Plot the logarithms of the cumulative fluoride ion concentrations (0.1, 0.2, 0.5, and 1.0 µg/mL) versus potential, in mV.

Analysis: Transfer the *Sample* to a beaker containing a plastic-coated stirring bar. Add 20 mL of water and 2.0 mL of hydrochloric acid, and stir until dissolved. Add 50.0 mL of *Buffer* and sufficient water to make 100 mL (*Sample solution*). Rinse and dry the electrodes, insert them into the *Sample solution*, stir for 5 min, and read the potential, in mV. From the measured potential and the *Standard response line* determine the concentration, *C*, in µg/mL, of fluoride ion in the *Sample solution*.

Calculate the percentage of fluoride ion in the portion of Dibasic Potassium Phosphate taken:

$$\text{Result} = (C/C_U) \times 100$$

C = concentration of fluoride ion in the *Sample solution* (µg/mL), as defined above

C_U = concentration of the *Sample solution* (µg/mL)

Acceptance criteria: NMT 0.001%

• **Limit of Monobasic or Tribasic Salt**

Sample solution: Dissolve 3 g in 30 mL of water, and cool to 20°.

Analysis: Add 3 drops of thymol blue TS to the *Sample solution*.

Acceptance criteria: A blue color is produced, which is changed to yellow (with a greenish tinge) by the addition of NMT 0.4 mL of 1 N hydrochloric acid.

SPECIFIC TESTS

• **pH** ⟨791⟩**:** 8.5–9.6, in a solution (1 in 20)

• **Loss on Drying** ⟨731⟩**:** Dry a sample at 105° to constant weight: it loses NMT 1.0% of its weight.

ADDITIONAL REQUIREMENTS

• **Packaging and Storage:** Preserve in well-closed containers.

• **USP Reference Standards** ⟨11⟩

USP Sodium Fluoride RS

Auxiliary Information - Please check for your question in the FAQs before contacting USP.

Topic/Question	Contact	Expert Committee
DIBASIC POTASSIUM PHOSPHATE	Documentary Standards Support	SM32020 Small Molecules 3

Topic/Question	Contact	Expert Committee
REFERENCE STANDARD SUPPORT	RS Technical Services RSTECH@usp.org	SM32020 Small Molecules 3

Chromatographic Database Information: Chromatographic Database

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