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ProductInformation

PHOSPHORIC ACID, ACS REAGENT
Product Number **P 6560**
21,510-4 is an exact replacement for P 6560

CAS NUMBER: 7664-38-2
SYNONYM: orthophosphoric acid, phosphoric(V) acid

PHYSICAL DESCRIPTION:

Appearance: clear colorless, syrupy liquid[1,2]
Molecular formula: H_3PO_4
Molecular weight: 98.00
Structure: $(HO)_3$-P=O
Density: 1.685 g/mL[2]
Assay: ≥ 85% (w/w) in water[3]
Effective molarity: 14.7 M based on density at 25°C
Melting point: for 100% compound, 42°C; for ≈ 88% solution, 29°C.
Easily supercooled, but may crystallize on prolonged cooling.[2]
pK_a values: pK_1 = 2.15, pK_2 = 7.09, pK_3 = 12.32[2,4]
$\Delta pK/\Delta T$ = -0.003[4]

This product meets criteria set by the American Chemical Society.

STABILITY / STORAGE AS SUPPLIED:

This solution is stable at room temperature for years; as for any acid, it should be kept well-sealed and away from bases or metals.

SOLUBILITY / STABILITY OF SOLUTIONS:

This solution is infinitely soluble in water or alcohol; it is soluble at 1 part in 8 of a 3:1 (v/v) ether:alcohol mixture.[2] The pH of a 0.1 N aqueous solution is approximately 1.5.[2] Approximately 67.8 mL are required to prepare 1 L of 1.0 M phosphoric acid.[5] Solutions adjusted with sodium hydroxide for buffer use are stable at room temperature if sterile, but should be stored at 2-8°C if not sterile. These buffers, with or without added sodium chloride, are stable to autoclaving.

USAGE REMARKS:

One of the numerous uses for phosphoric acid is in the production of phosphate fertilizers for agriculture. Dilute solutions of food-grade phosphoric acid have been widely used in soft drinks to add a sharp flavor.

USAGE REMARKS: (continued)

In biochemistry, phosphoric acid is extensively used as a physiological buffer. If sodium chloride is present, the mixture is commonly called "PBS" for "phosphate buffered saline." Most buffers are prepared from the monohydrogen and dihydrogen salts of phosphoric acid, rather than from the free acid, as a matter of convenience. Recipes and mixing tables are found in many standard reference books.[5,6,7] Preparing a buffer with the free acid requires diluting the acid into water to a suitable molarity, adjusting the pH with sodium or potassium hydroxide as desired.

The Sigma catalog lists a number of phosphate buffers and PBS products prepared for different biochemical applications.

REFERENCES:

1. Sigma quality control.
2. *Merck Index*, 12th Ed., #7500 (1996).
3. *Reagent Chemicals*, 8th Ed. (American Chemical Society, 1993), 519-522.
4. *Data for Biochemical Research*, 3rd Ed., Dawson, R.M.C., et al., (Oxford Press, 1987), p. 423-425.
5. Ibid., p. 553.
6. Ibid., 432, 441.
7. *Molecular Cloning: A Laboratory Handbook*, 2nd Ed., Sambrook, Frisch & Maniatis (Cold Spring Harbor Lab. Press, 1989), Vol. 3, Appendices.
8. *Guide to Protein Purification*, Vol. 182 of *Methods in Enzymology* (Academic Press, 1990), p. 27-38.