TETRASODIUM PYROPHOSPHATE

Prepared at the 41st JECFA (1993), published in FNP 52 Add 2 (1993) superseding specifications prepared at the 37th JECFA (1990), published in FNP 52 (1992). Metals and arsenic specifications revised at the 55th JECFA (2000). A group MTDI of 70 mg/kg bw, as phosphorus from all food sources, was established at the 26th JECFA (1982)

SYNONYMS Tetrasodium diphosphate, sodium pyrophosphate; INS No 450 (iii)

DEFINITION

Chemical names	Tetrasodium diphosphate, tetrasodium pyrophosphate
C.A.S. number	7722-88-5
Chemical formula	Anhydrous: $Na_4P_2O_7$ Decahydrate: $Na_4P_2O_7 \cdot 10H_2O$
Formula weight	Anhydrous: 265.94 Decahydrate: 446.09
Assay	Not less than 95.0% on the ignited basis

DESCRIPTION Colourless or white crystals, or a white crystalline or granular powder; the decahydrate effloresces slightly in dry air

FUNCTIONAL USES Emulsifier, buffering agent, emulsifying agent, sequestrant

CHARACTERISTICS

IDENTIFICATION

Solubility (Vol. 4)	Soluble in water; insoluble in ethanol
pH (Vol. 4)	9.9 - 10.8 (1 in 100 soln)
Test for phosphate (Vol. 4)	Passes test
Test for sodium (Vol. 4)	Passes test

PURITY

Loss on ignition (Vol. 4)	Not more than 0.5% for anhydrous, 38-42% for decahydrate (105º, 4h then 550º, 30 min)
Water insoluble matter	Not more than 0.2% Dissolve 10 g of the sample in 100 ml of hot water, and filter through a tared filtering crucible. Wash the insoluble residue with hot water, dry at 105° for 2 h, cool and weigh.
Fluoride	Not more than 10 mg/kg (Method I or III)

Arsenic(Vol. 4)	Not more than 3 mg/kg
Lead (Vol. 4)	Not more than 4 mg/kg Determine using an atomic absorption technique appropriate to the specified level. The selection of sample size and method of sample preparation may be based on the principles of the method described in Volume 4, “Instrumental Methods.”

METHOD OF ASSAY

Dissolve an accurately weighed quantity of the sample, equivalent to about 500 mg of anhydrous $Na_4P_2O_7$, in 100 ml of water in a 400-ml beaker. Adjust the pH of the solution to 3.8 with hydrochloric acid, using a pH meter, then add 50 ml of a 1 in 8 solution of zinc sulfate (125 g of $ZnSO_4 \cdot 7H_2O$ dissolved in water, diluted to 1000 ml, filtered, and adjusted to pH 3.8) and allow to stand for 2 min. Titrate the liberated acid with 0.1 N sodium hydroxide until a pH of 3.8 is again reached. After each addition of sodium hydroxide near the end-point, time should be allowed for any precipitated zinc hydroxide to redissolve. Each ml of 0.1 N sodium hydroxide is equivalent to 13.30 mg of $Na_4P_2O_7$.