

## SODIUM POLYPHOSPHATES, GLASSY

*Prepared at the 46th JECFA (1996), published in FNP 52 Add 4 (1996) superseding specifications prepared by the 20th JECFA (1976), published in FNS 1B (1977) and 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

Sodium hexametaphosphate, sodium tetrapolyphosphate, Graham's salt; INS No 452(i)

### DEFINITION

Obtained by fusion and subsequent chilling of sodium orthophosphates; a class of compounds consisting of several amorphous, water-soluble polyphosphates composed of linear chains of metaphosphate units,  $(\text{NaPO}_3)_x$  where  $x=2$ , terminated by  $\text{Na}_2\text{PO}_4$  groups; usually identified by their  $\text{Na}_2\text{O}/\text{P}_2\text{O}_5$  ratio or their  $\text{P}_2\text{O}_5$  content. The  $\text{Na}_2\text{O}/\text{P}_2\text{O}_5$  ratios vary from about 1.3 for sodium tetrapolyphosphate, where  $x =$  approximately 4; to about 1.1 for Graham's salt, commonly called sodium hexametaphosphate, where  $x = 13$  to 18; and to about 1.0 for the higher molecular weight sodium polyphosphates, where  $x = 20$  to 100 or more. The pH of their solutions varies from about 3 to 9.

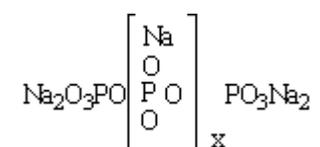
### Chemical names

Sodium tetrapolyphosphate, sodium hexametaphosphate, sodium polyphosphate

### C.A.S. number

68915-31-1, 10124-56-8, 10361-03-2

### Structural formula



### Assay

Not less than 60.0% and not more than 71.0% of  $\text{P}_2\text{O}_5$

### DESCRIPTION

Colourless or white, transparent platelets, granules, or powders

### FUNCTIONAL USES

Emulsifier, sequestrant, texturizer

### CHARACTERISTICS

#### IDENTIFICATION

##### Solubility (Vol. 4)

Very soluble in water

##### Test for sodium (Vol. 4)

A 1 in 20 solution passes test

##### Test for orthophosphate

Dissolve 0.1 g of the sample in 5 ml of hot dilute nitric acid TS. Warm on a steam bath for 10 min, and cool. Neutralize to litmus with sodium hydroxide TS, and add silver nitrate TS. A yellow precipitate is formed which is soluble in dilute nitric acid TS.

#### PURITY

<u>Loss on ignition</u> (Vol. 4)	Not more than 1.0%
<u>Insoluble substances</u>	Not more than 0.1% Dissolve about 10 g of the sample, accurately weighed, 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, and weigh.
<u>Fluoride</u> (Vol. 4)	Not more than 10 mg/kg (Method I or III)
<u>Arsenic</u> (Vol. 4)	Not more than 3 mg/kg
<u>Lead</u> (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**

Transfer about 800 mg of the sample, accurately weighed, into a 400-ml beaker. Add 100 ml of water and 25 ml of nitric acid, cover with a watch glass, and boil for 10 min on a hot plate. Rinse any condensate from the watch glass into the beaker; cool the solution to room temperature; transfer it quantitatively to a 500-ml volumetric flask; dilute to volume with water; and mix thoroughly. Pipet 20.0 ml of this solution into a 500-ml Erlenmeyer flask, add 100 ml of water, and heat just to boiling. Add with stirring 50 ml of quimociac TS, then cover with a watch glass, and boil for 1 min in a well-ventilated hood. Cool to room temperature, swirling occasionally while cooling, then filter through a tared, sintered-glass filter crucible of medium porosity, and wash with five 25-ml portions of water. Dry at about 225° for 30 min, cool, and weigh. Each mg of precipitate thus obtained is equivalent to 32.074 µg of P<sub>2</sub>O<sub>5</sub>.