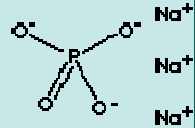


# TRISODIUM PHOSPHATE

## PRODUCT IDENTIFICATION

CAS NO.	7601-54-9; 96337-98-3 (Anhydrous) 10101-89-0 (Dodecahydrate)	
EINECS NO.	231-509-8	
FORMULA	Na <sub>3</sub> PO <sub>4</sub>	
MOL WT.	163.94	
H.S. CODE	2835.29.3000	
TOXICITY	Skin Rat LD > 300mg/kg	
SYNONYMS	Sodium phosphate tribasic; Sodium orthophosphate; TSP; Sodium phosphate; Trisodium orthophosphate; Phosphoric acid, trisodium salt; Trinatriumphosphat (German); Tertiary sodium phosphate; Sodium tertiary phosphate;	
SMILES	P(=O)([O-])([O-])[O-].[Na+].[Na+].[Na+]	
CLASSIFICATION	Cleaning agent, Food additive, Degreaser, Flux, Photographic chemical, Phosphate.	
EXTRA NOTES	EPA Pesticide Chemical Code 076406,	

## PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE	white granular powder
MELTING POINT	73 - 77 C
BOILING POINT	
SPECIFIC GRAVITY	1.62
SOLUBILITY IN WATER	Appreciable
pH	Strong base
VAPOR DENSITY	2.5
AUTOIGNITION	
NFPA RATINGS	
REFRACTIVE INDEX	
FLASH POINT	
STABILITY	Stable under ordinary conditions

## GENERAL DESCRIPTION & EXTERNAL LINKS

photographic developers; removing boiler scale; water softer; wet finishing - pH value adjustment; aluminium polishing, burnishing; sugar refining; complementary feeding stuff ; cleaning compound; TSP is used for washing surfaces prior to painting, especially exterior surfaces. Liquid bleach is often added to TSP if there is mildew on the surfaces. The TSP and bleach act in concert to both kill the mildew and remove its characteristic stains. It may be used on inside surfaces also, but try to mask all surfaces except the one you want to clean. It can damage many metal and painted surfaces, and can stain woods. It is not recommended for use on glass, either, since it will leave a filmy residue.

TSP can also be used as a masonry cleaner. However, if efflorescence or mortar staining are severe, you may need to resort to a more powerful but dangerous product, muriatic acid.

TSP and TSP-bleach solutions may be applied with a sponge or brush, or can be sprayed on.

Generally, you will have to apply some elbow-grease if the mildew or other staining is severe. If you are washing the exterior of a house, it may be worthwhile for you to look into the rental of commercial powerwashing equipment. You may be able to do all necessary cleaning from the ground level, sparing you the risk of extra ladderwork.

A colourless crystalline compound, Na<sub>3</sub>PO<sub>4</sub>, soluble in water and insoluble in ethanol. It is known both as the decahydrate (octagonal; r.d. 2.54) and the dodecahydrate (trigonal; r.d. 1.62) The dodecahydrate loses water at about 76°C and the decahydrate melts at 100°C. Trisodium phosphate may be prepared by boiling sodium carbonate with the stoichiometric amount of phosphoric acid and subsequently adding sodium hydroxide to the disodium salt thus formed. It is useful as an additive for high-pressure boiler feed water (for removal of calcium and magnesium as

phosphates), in emulsifiers, as a water-softening agent, and as a component in detergents and cleaning agents. Sodium phosphate labelled with the radioactive isotope  $^{32}\text{P}$  is used in the study of the role of phosphate in biological processes and is also used (intravenously) in the treatment of polycythaemia.

#### SALES SPECIFICATION

##### TECH GRADE

APPEARANCE	White Powder
ASSAY	97.5 % min
PH	11.5 - 12.5 (1% sol.)
WATER INSOLUBLES	0.1 % max
IRON(Fe)	0.05 % max

##### FOOD GRADE

APPEARANCE	White Powder
ASSAY	97.0 - 103.0 %
Ph	11.5 - 12.5 (1% sol.)
CHLORIDE(Cl)	0.2 % max
SULFATE(SO <sub>4</sub> )	0.05 % max
ARSENIC(As)	4 ppm max
HEAVY METAL(Pb)	20 ppm max
loss ON DRYING	5.0 % max

##### TRANSPORTATION

PACKING	
HAZARD CLASS	8 (Packing Group: III)
UN NO.	3262

##### OTHER INFORMATION

Hazard Symbols: C, Risk Phrases: 34, Safety Phrases: 26-36/37/39-45

##### DESCRIPTION OF PHOSPHORUS

Phosphorus is a nonmetallic chemical element in group 15 (nitrogen family, formerly Va) of periodic table; atomic number 15 atomic mass 30.9738; melting point ca 44.1 C (white); boiling point ca 280 C (white); specific gravity 1.82 (white), 2.34 (red), 2.70 (black); valence -3, +3, or +5 ; electronic config. 2-8-5 or 1s 2s 2p 6s 2p 3. The phosphorus molecule is composed of four phosphorus atoms, P<sub>4</sub>. Phosphorus exists in a number of allotropic forms [white (alpha and beta), red, black and/or violet] in the same physical state. White phosphorus is a white to yellow waxy substance which ignites spontaneously in air to form white fumes of phosphorus pentoxide and glows without emitting heat. Phosphorus is stored underwater as it is extremely poisonous, insoluble in water (but soluble in carbon disulfide). Commercial production of elemental phosphorus is prepared from phosphorite or phosphate rock (apatite, an impure calcium phosphate mineral) reacting with coke and sand or silica pebbles or at high temperatures in an electric furnace. Calcium silicate is produced as a by-product. White phosphorus is used as a deoxidizing agent in the preparation of steel and phosphor bronze. It is also used in rat poisons and to make smoke screens (by burning) for warfare. When white phosphorus is heated to about 250 C with air absence, it changes into the red phosphorus. Red phosphorus, a dark redish powder or crystal, does not ignite spontaneously unless heated to 200 C, does not phosphoresce and it is a little less dangerous than white phosphorus. It is used to make matches. Red phosphorus is prepared commercially by heating calcium phosphate with sand and coke in an electric furnace. Black allotrope is obtained industrially by heating at 300 C under pressure with a mercury catalyst. It has a layer structure and is stable. The major use of phosphorus compounds is in fertilizers, mainly as a mixture called superphosphate (calcium hydrogen phosphate), obtained from phosphate minerals by sulfuric acid treatment; and in

nitrophosphates. Phosphorus is burned to make phosphorus pentoxide [phosphorus(V) oxide], a white solid used as a chlorinating agent in organic chemistry, as a drying agent and mainly converted to phosphoric acid used to make phosphates for fertilizers, electro chemical polishing and shaping, electroplating, metal cleaning and pickling in metal treatment by reaction with water. Phosphorus is highly reactive. A wide range of compounds is formed for uses in detergents, water softeners, pharmaceuticals, dentifrices, and in many other important applications. It forms metal phosphides and covalently bonded phosphorus(III) and phosphorus(V) compounds. Phosphoric acid can combine with certain alkaline elements to form salts called phosphates.