

Trisodium Phosphate (TSP)

Trisodium phosphate (TSP) is a cleaning agent, lubricant, food additive, stain remover and degreaser. It is a white, granular or crystalline solid, highly soluble in water producing an alkaline solution.

The item of commerce is often partially hydrated and may range from anhydrous trisodium phosphate, Na_3PO_4 , to the dodecahydrate, $\text{Na}_3\text{PO}_4 \cdot 12\text{H}_2\text{O}$. Most often found in white powder form, it can also be called trisodium orthophosphate or simply sodium phosphate. Trisodium phosphate was at one time extensively used in formulations for a wide variety of consumer grade soaps and detergents, but ecological problems have largely ended that practice, at least in the western world. Substitutes are not as effective, but the raw chemical can be bought in bulk to add to other detergents.



Specification: Trisodium Phosphate Anhydrous

Items \ Spec		Food Grade	Industrial Grade
Trisodium Phosphate Na_3PO_4 (on dried material) % (w/w)	% \geq	98.0	98.0
P_2O_5 % (w/w)	% \geq	39.5	39.5
Sodium Oxide, as Na_2O	% \geq	36-40	36-40
Sulphate, as SO_4	% \leq	0.25	-
Heavy Metal (as Pb)	% \leq	0.001	-
Arsenic (as)	% \leq	0.0003	-
Fluoride (as F)	% \leq	0.005	-
PH (1% aqueous solution)		11.5-12.5	11.5-12.5

Identifiers

SKU: D9023-1

CAS number: 7601-54-9

HS Code(US): 2835.29.3000

Properties

Molecular formula: Na_3PO_4

Molar Mass:
163.94g/mol

Density: 2.537g/cm³

Melting Point: 1340°C

Appearance: white crystalline

Solubility in Water:

1.5 g/100 mL (0 °C)

8.8 g/100 mL (25 °C)

Specification: Trisodium Phosphate Dodecahydrate

Items \ Spec		Food Grade	Industry Grade
Trisodium Phosphate Na_3PO_4 (on dried material) % (w/w)	% \geq	98.0	98.0

Identifiers

SKU: D9023-2

CAS number: 10101-89-0

HS Code(US): 2835.29.3000

P ₂ O ₅ %(w/w)	% ≥	18.3	18.3	Properties Molecular formula: Na ₃ PO ₄ •12H ₂ O Molar Mass: 380.14g/mol Appearance: white crystalline Density: 1.620g/cm ³ Melting Point: 73.5°C(decom.)
Sodium Oxide, as Na ₂ O	% ≤	15.5-19.0	15.5-19.0	
Sulphate, as SO ₄	% ≤	0.5	0.5	
Heavy Metal (as Pb)	% ≤	0.001	-	
Arsenic (as)	% ≤	0.0003	-	
Fluoride (as F)	% ≤	0.005	-	
Water Insoluble	% ≤	0.05	-	
PH (1% aqueous solution)		11.5-12.5	11.5-12.5	
Protection	Do not ingest. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.			
Packing and Storage	In double layer bags of net weight of 25 Kg or 50 Kg, store at a cool, dry and well ventilated place.			
Applications	Cleaning The major use for trisodium phosphate is in cleaning agents. The pH of a 1% solution is 12, and the solution is sufficiently alkaline to saponify grease and oils. In combination with surfactants, TSP is an excellent agent for cleaning everything from laundry to concrete driveways. This versatility and low manufacturing price, made TSP the preferred basis for a plethora of cleaning products sold in the mid-20th century. TSP is still sold, and used, as a cleaning agent, but during the late 1960s in the United States government regulators in seventeen states determined that overuse led to a series of ecological problems with the damage to lakes and rivers through eutrophication being the most significant. By the end of the 20th century, many products that formerly contained TSP were manufactured with TSP substitutes, which consist mainly of sodium carbonate along with various admixtures of nonionic surfactants and a limited percentage of sodium phosphates. TSP is commonly used after cleaning with mineral spirits in order to remove hydrocarbon residues. TSP may be used with household chlorine bleach in the same solution without hazardous reactions. This mixture is particularly good for removing mildew, but is ineffective at permanently removing mold. Although it is still the active ingredient in some toilet bowl cleaning tablets, TSP is generally not good for cleaning bathrooms, because it can stain metal and can			

	<p>damage grout.</p> <p>Flux</p> <p>In the United States, trisodium phosphate is an approved flux for use in hard soldering joints in medical grade copper plumbing. The flux is applied as a concentrated water solution and dissolves copper oxides at the temperature used in copper brazing. Residues are fully water soluble and can be rinsed out of plumbing before it is put in service.</p> <p>TSP is used as an ingredient in fluxes designed to deoxygenate nonferrous metals for casting.</p> <p>TSP can be used in ceramic production to lower the flow point of glazes.</p> <p>Painting enhancement</p> <p>TSP is still in common use for the cleaning, degreasing and deglossing of walls prior to painting. TSP breaks the gloss of oil based paints and opens the pores of latex based paint providing a surface better suited for the adhesion of the subsequent layer.</p> <p>Food additive</p> <p>Sodium phosphates (monosodium phosphate, disodium phosphate, and trisodium phosphate) are approved as a food additive in the EU, E339.</p> <p>Exercise performance enhancement</p> <p>Trisodium phosphate has gained a following as a nutritional supplement that can improve certain parameters of exercise performance. The basis of this belief is the fact that phosphate is required for the energy-producing Krebs cycle central to aerobic metabolism. Phosphates are available from a number of other sources that are much milder than TSP. While TSP is not toxic per se, it is severely irritating to gastric mucosa unless used as part of a buffered solution.</p>
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*Data from Wikipedia