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Technical Data Sheet (TDS)

- Trisodium Phosphate (TSP) Food Grade
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1. Product Overview

- **Product Name**: Trisodium Phosphate (TSP) - Food Grade (Dodecahydrate)
- **CAS Number**: 7601-54-9
- **EINECS/EC Number**: 231-509-8
- **Chemical Formula**: $Na_3PO_4 \cdot 12H_2O$
- **Molecular Weight**: 380.12 g/mol
- **Product Characteristics**: High-purity food-grade TSP (dodecahydrate) is a white crystalline powder with high hygroscopy and strong alkaline properties, odorless and slightly salty. As a **multi-functional inorganic food additive**, it has five core functions in food production: (1) pH Regulator/Buffering Agent: Adjusts and stabilizes food system pH, enhances food stability; (2) Water Retention Agent: Improves water holding capacity of meat/seafood, reduces juice loss during processing/storage; (3) Emulsifier: Promotes oil-water emulsification, improves texture of dairy/meat products; (4) Anticaking Agent: Prevents caking of powder food (flour, seasoning), improves flowability; (5) Chelating Agent: Chelates metal ions (Ca^{2+}, Mg^{2+}), prevents food discoloration and oxidation. FDA GRAS/EU E339(iii) certified; compliant with GB 1886.31-2021/GB 2760-2021 standards, widely used in meat, dairy, bakery and other food industries. It is also a safe food processing aid for cleaning food contact surfaces (corrosive, must be rinsed thoroughly).

2. Technical Specifications (Compliant with GB 1886.31-2021 & FCC/USP)

Item	Standard Requirement (Food Grade)
Appearance	White crystalline powder, free-flowing, no caking
Odor/Taste	Odorless, slightly salty, no off-taste
Assay ($Na_3PO_4 \cdot 12H_2O$, dry basis)	≥98.0%
Loss on Drying (150℃, 4h)	44.0~47.0%
pH Value (1% aqueous solution, 25℃)	11.5~12.5
Chloride (as Cl^-)	≤0.01%
Sulfate (as SO_4^{2-})	≤0.01%
Heavy Metals (as Pb)	≤1 ppm
Arsenic (As)	≤0.5 ppm
Fluoride (as F^-)	≤0.005%
Iron (Fe)	≤5 ppm
Insoluble Matter in Water	≤0.01%
Water Solubility (25℃)	≥10.0 g/100mL
Total Bacterial Count	≤100 CFU/g
Yeast & Mold	≤10 CFU/g
E. coli	Negative
Salmonella	Negative in 25g
Temperature Stability	Stable at 0-70℃ (food processing temperature); dehydrates >73.4℃
pH Stability	Stable at pH 8.0-13.0 (100% efficacy retention)
Storage Stability	24 months (unopened), 6 months after opening

3. Product Advantages

1. **Multi-Functional**: Integrates pH regulation, water retention, emulsification, anticaking and chelation functions; one additive meets multiple food processing needs, reducing production cost.

2. **High Efficiency**: Low dosage achieves obvious effect (0.5-5.0 g/kg); excellent water retention for meat/seafood (reduces juice loss by 10-20%).
3. **Good Process Adaptability**: Stable at normal food processing temperatures (0-70℃); soluble in water, easy to disperse in food system, no precipitation/agglomeration.
4. **High Safety**: FDA GRAS certified; metabolizes to phosphate ions (essential nutrient for human body) in the body; no residual, no toxic by-products at standard dosage.

4. Application Fields & Recommended Dosage

Comply with **GB 2760-2021 (China)**, EC 1333/2008 (EU) and FDA 21 CFR 182.6781 (US) standards; adjust dosage according to food type, processing technology and quality requirements (all dosages are **w/w** based on food raw materials; GMP use for EU/US).

5. Usage Methods & Formulation Guidelines

Application Field	Typical Products	Recommended Dosage	Core Effect
Processed Meat	Ham, sausage, bacon, lunch meat, preserved meat	0.5-2.0%	Water retention, emulsification, pH regulation
Seafood	Frozen fish/shrimp, surimi, seafood balls	0.3-1.5%	Water retention, chelation, prevent discoloration
Dairy Products	Cheese, yogurt, milk powder, dairy beverage	0.1-0.8%	Emulsification, pH buffering, texture improvement
Bakery & Pastry	Bread, cake, biscuit, flour	0.05-0.5%	Anticaking, pH regulation, dough improvement
Beverage & Condiment	Carbonated beverage, soy sauce, vinegar, salad dressing	0.02-0.3%	pH buffering, flavor stabilization, chelation
Canned Food	Canned meat/fish/vegetable/fruit	0.2-1.0%	pH regulation, water retention, corrosion inhibition (can)
Powder Food	Seasoning, milk powder, flour, nutritional powder	0.05-0.4%	Anticaking, flowability improvement
Food Processing Aid	Cleaning agent for food contact surfaces (stainless steel)	1-5% (aqueous solution)	Decontamination, degreasing (rinse thoroughly after use)

Key Tip: Must be prepared into aqueous solution for food use (no direct addition of powder); strictly control dosage (strong alkalinity); avoid contact with aluminum food contact surfaces; neutralize in acidic food systems to pH 6-8.

1. **Aqueous Solution Preparation**: Weigh the required amount of TSP, dissolve in **food-grade deionized water** to prepare a 5-10% aqueous solution (1:9-1:19 powder:water); stir until completely dissolved (no undissolved particles). Suitable for all food types (liquid/semi-solid/solid).

6. Packaging, Storage & Transportation

- **Small Packaging**: 1 kg/5 kg food-grade sealed HDPE plastic bags (inner PE liner, for small food factories)
- **Standard Packaging**: 25 kg food-grade HDPE plastic drums (sealed, dust-proof, corrosion-resistant; for industrial batch production)
- **Bulk Packaging**: 500 kg/1000 kg food-grade jumbo bags (inner PE liner, sealed; for large-scale food production)

7. Safety Operation & Protection

1. **Operation Personnel**: Only trained professional personnel (familiar with corrosion protection and dosage limits) can operate; conduct regular occupational health examinations (focus on skin, eyes and respiratory system).
2. **Personal Protection**: Wear **full PPE** during all operations: N95/P95 dust mask, splash-proof chemical goggles with face shield, chemical-resistant nitrile rubber gloves (≥0.3mm thickness) and corrosion -resistant food-grade overalls; wear anti-slip chemical-resistant shoes.