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Technical Data Sheet (TDS)

- DL-Alanine (Food Grade)
Issue Date: 26 FEB 2026 | Version: V1.0

1. Product Overview

- **Product Name**: DL-Alanine (Food Grade)
- **CAS Number**: 302-72-7
- **EINECS/EC Number**: 206-126-4
- **Chemical Formula**: $C_3H_7NO_2$
- **Molecular Weight**: 89.09 Da
- **Chemical Name**: DL-2-Aminopropanoic acid / Racemic Alanine
- **Product Characteristics**: High-purity food-grade DL-Alanine prepared by microbial fermentation and refined purification (non-GMO, no chemical synthesis). White free-flowing crystalline powder with slight amino acid odor, good water solubility (clear solution), moderate buffer capacity, and extremely stable under normal food processing and storage conditions. As a multi-functional food additive, it acts as **flavor enhancer, nutrient fortifier, taste improver and buffer**; it enhances the umami/savory flavor of food, fortifies amino acid nutrition, improves taste layering, and stabilizes the pH of food systems. Non-toxic, environmentally friendly, fully biodegradable, compliant with GB 2760/FDA/EC/CAC/FCC/USP standards, suitable for various food production and processing.

2. Technical Specifications (Compliant with GB 2760 & FCC/USP)

Item	Standard Requirement
Appearance	White crystalline powder; free-flowing, no caking
Odor	Slight characteristic amino acid odor; no off-flavor
Assay (DL-Alanine)	≥ 99.0%
Specific Rotation (25℃, 5% in H_2O)	±0.5°
Moisture Content	≤ 0.5%
Ash Content	≤ 0.1%
pH Value (5% aqueous, 25℃)	5.5-7.0
Heavy Metals (as Pb)	≤ 1 ppm
Arsenic (As)	≤ 0.5 ppm
Cadmium (Cd)	≤ 0.05 ppm
Mercury (Hg)	≤ 0.01 ppm
Total Bacterial Count	≤ 100 CFU/g
E. coli	Negative
Salmonella	Negative in 25g
Chloride (Cl^-)	≤ 0.01%
Sulfate (SO_4^{2-})	≤ 0.01%
Water Solubility (25℃)	166 g/L (clear aqueous solution)
Bulk Density	0.70-0.90 g/cm³
Temperature Stability	Stable at 0-121℃ (short-time high temperature sterilization; ≥98% activity retention)
pH Stability	Stable at pH 4.0-8.0 (≥98% activity retention)
Buffer Capacity	Effective in pH 5.0-7.0 food systems
Storage Stability	36 months unopened (≤25℃, ≤60% RH)

3. Product Advantages

1. **High Purity & Standard Quality**: Assay ≥99.0%, heavy metal content far lower than national/FCC/USP standards; consistent quality, no impurities, meets strict food safety requirements.

2. **Natural & Safe**: Microbial fermentation (non-GMO) and refined purification, no chemical additives/solvents; FDA GRAS/EC E925 certified, safe for all population groups (including children and the elderly).

Application Field	Typical Products	Recommended Dosage	Core Effect
Beverage	Sports drink, amino acid drink, fruit juice, flavored milk, carbonated drink	0.5-3.0%	Nutrient fortification, pH buffering, taste improvement, flavor enhancement
Bakery & Pastry	Bread, cake, biscuit, pastry, steamed bun	0.2-1.0%	Improve dough texture, enhance savory flavor, pH buffering, extend shelf life
Dairy Products	Yogurt, cheese, milk powder, flavored yogurt, dairy beverage	0.3-1.5%	Amino acid fortification, regulate fermentation pH, improve taste and mouthfeel
Meat Products	Sausage, ham, meatball, canned meat, cured meat	0.5-2.0%	Enhance umami/savory flavor, improve juiciness/tenderness, pH buffering, inhibit fat oxidation
Condiments	Soy sauce, oyster sauce, compound seasoning, soup base, marinade	0.8-3.0%	Boost umami flavor, improve taste layering, stabilize pH, enhance flavor stability
Sports Nutrition Food	Protein powder, amino acid bar, fitness meal replacement, energy drink	2.0-10.0%	Amino acid supplementation, muscle energy supply, taste improvement
Instant Food	Instant noodles, instant porridge, instant soup, frozen food	0.3-1.0%	Nutrient fortification, flavor enhancement, pH buffering, improve rehydration taste
Health Food	Amino acid tablets/capsules, nutritional supplements, meal replacement	5.0-20.0%	Targeted amino acid fortification, balanced nutrition, pH buffering

5. Usage Methods & Formulation Guidelines

1. **Premixing Recommended**: For **solid food systems** (protein powder, bakery flour, seasoning powder, meal replacement powder), premix DL-Alanine with other dry ingredients (sugar, starch, salt, milk powder) at a ratio of 1:10-1:20 to ensure uniform dispersion; no dust generation with proper mixing.
2. **Dissolution Method**: For **liquid food systems** (beverage, sauce, soup base, dairy drink), dissolve DL-Alanine in deionized water/liquid raw materials (20-40℃) with stirring (can be prepared as 20-50% stock solution); stir evenly to form a clear solution, then add to the food system (no precipitation); add slowly to avoid local concentration differences.

6. Packaging, Storage & Transportation

- Small Packaging: 1 kg/5 kg food-grade aluminum foil bags (inner PE liner, vacuum sealed; for small food factories/laboratory use)
- Standard Packaging: 25 kg food-grade HDPE plastic drums (sealed, with inner PE bag; for industrial batch production)

7. Quality Assurance & Technical Support

1. **Production Standards**: Manufactured in a GMP/HACCP-compliant food-grade production workshop; comply with ISO 9001 (Quality Management System) and ISO 22000 (Food Safety Management System); microbial fermentation process is green, no chemical pollution, non-GMO raw materials.
2. **Batch Testing**: Every batch of DL-Alanine is subject to **strict multi-index testing** (physical, chemical, microbiological, purity, specific rotation); a detailed Certificate of Analysis (COA) is provided with each shipment to ensure compliance with GB 2760/FCC/USP/EC standards.