

Technical Data Sheet (TDS)

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1. Product Overview

- **Product Name:** DL-Methionine
- **Chemical Name:** DL-2-Amino-4-(methylthio)butanoic acid; DL-2-Aminopentanoic acid-5-thiol
- **CAS Number:** 59-51-8
- **Molecular Formula:** C₅ H₁₁NO₂S
- **Molecular Weight:** 149.21 g/mol
- **Product Trait:** White odorless to slight characteristic odor crystalline powder; non-hazardous solid; mild respiratory irritation only from high-concentration dust inhalation; soluble in water/dilute acid/alkali, slightly soluble in ethanol, insoluble in organic solvents; stable under normal storage/use conditions; essential sulfur-containing amino acid for human/animal body, cannot be synthesized by the body and needs to be supplemented externally. **FOR FEED ADDITIVE, FOOD ADDITIVE, PHARMACEUTICAL INTERMEDIATE, INDUSTRIAL RAW MATERIAL AND BIOCHEMICAL REAGENT USE ONLY.**
- **Core Properties:** High purity (≥98.0%, food/feed/pharm grade ≥99.0%); low heavy metal and impurity content; excellent stability under normal processing conditions; non-toxic and safe for human/animal/environment; fully biodegradable; compliant with global food/feed/pharm standards (GB 2760, FDA GRAS, EP, USP); the most important sulfur-containing amino acid in feed industry; long shelf life (36 months).
- **Main Application:** Feed additive (core essential amino acid supplement for poultry/livestock/aquatic, improve feed conversion rate); food additive (nutrient supplement for dairy, bakery, beverage); pharmaceutical intermediate (amino acid injection, oral amino acid preparation, liver-protecting drugs); industrial raw material (cosmetic humectant, hair care product additive, polymer synthesis monomer); biochemical reagent (cell culture, protein synthesis).

2. Technical Specifications (Industrial/Food/Feed/Pharm Grade)

Item	Specification (Industrial Grade)	Specification (Food/Feed/Pharm Grade)
Appearance	White crystalline powder	White crystalline powder/crystals
Assay (DL-Methionine)	≥98.0% (HPLC)	≥99.0% (HPLC)
Melting Point (Decomposition)	281-285°C	282-284°C
pH Value (1% aqueous, 25°C)	5.5-6.5	5.8-6.2
Loss on Drying	≤0.5%	≤0.2%
Residue on Ignition	≤0.1%	≤0.05%
Heavy Metals (Pb)	≤5 ppm	≤1 ppm (AAS)
Heavy Metals (As)	≤1 ppm	≤0.5 ppm (AFS)
Chloride (Cl ⁻)	≤0.01%	≤0.005%
Sulfate (SO ₄ ²⁻)	≤0.01%	≤0.005%
Ammonium (NH ₄ ⁺)	≤0.02%	≤0.01%
Water Solubility (25°C)	≥3.0 g/100 mL	≥3.3 g/100 mL
Total Bacterial Count	≤100 CFU/g	≤10 CFU/g
E. coli	Negative	Negative
Yeast & Mold	≤50 CFU/g	≤5 CFU/g
Bulk Density	1.30-1.35 g/cm ³	1.32-1.34 g/cm ³
Particle Size	80-120 mesh (customizable)	80-120 mesh (customizable)

3. Product Advantages

- High Purity & Multi-Grade Compliance:** Assay $\geq 98.0\%$ (food/feed/pharm grade $\geq 99.0\%$) with ultra-low heavy metals, impurities and microbial content; meets Chinese Pharmacopoeia (2020), EP, USP, GB 2760 and feed additive national standards; suitable for high-end food, pharmaceutical, feed and biochemical reagent use.
- Essential Nutrient & High Efficacy:** The only sulfur-containing essential amino acid for animals/humans; as a feed additive, it can significantly improve feed conversion rate and animal growth performance; as a food additive, it supplements sulfur-containing amino acids and improves food nutritional value.

4. Application Fields & Dosage Guide

4.1 Main Application Fields

- Feed Industry:** Core essential amino acid supplement for broiler, layer, pig, cattle, fish and shrimp; improve feed amino acid balance, promote animal growth, increase lean meat rate, improve milk production of dairy cows; reduce feed cost and improve breeding efficiency.
- Food Industry:** Nutrient supplement for dairy products, bakery food, protein beverage, nutritional meal replacement; flavor enhancer for meat products, condiments; improve food protein quality and nutritional value.

4.2 Recommended Dosage (w/w in formulation, adjust by application demand)

Application Field	Dosage (Industrial Grade)	Dosage (Food/Feed/Pharm Grade)	Remarks
Feed - Broiler/Pig	0.1-0.5%	0.1-0.4%	Improve growth performance
Feed - Layer/Dairy Cow	0.05-0.3%	0.05-0.25%	Improve egg/milk production
Food - Dairy/Beverage/Bakery	—	0.05-0.5%	Nutrient supplement
Pharmaceutical - Injection/Oral Prep	—	2-99%	Raw material/intermediate
Cosmetic - Skin Care/Hair Care	0.1-1.0%	0.05-0.5%	Humectant/antioxidant
Polymer Synthesis - Monomer	5-99%	—	Adjust according to reaction
Biochemical Reagent - Lab Research	—	0.01-2.0% (w/v)	Aqueous solution

5. Usage & Formulation Guidelines

- Feed Formulation (Broiler Feed):** Mix feed grade DL-Methionine (0.2-0.4%) with corn, soybean meal, fish meal and other feed raw materials; stir evenly in a mixer for 5-10 minutes; granulate or use as powder feed; ensure uniform mixing to avoid local excess.
- Food Formulation (Protein Beverage):** Dissolve food grade DL-Methionine (0.1-0.3%) in purified water at 40-50°C; add to milk/soy milk base and stir evenly; add sweetener and stabilizer; sterilize at low temperature ($\leq 85^\circ\text{C}$); improve protein nutritional value.
- Pharmaceutical Formulation (Oral Amino Acid Powder):** Mix pharm grade DL-Methionine (10-30%) with other amino acids (glycine, alanine) and excipients (mannitol, lactose); grind into fine powder and mix evenly; pack into sachets; dust-free operation environment required.

6. Packaging & Storage

- 100g/500g/1kg HDPE plastic bottle:** Food/Pharm/Biochemical lab/R&D/small-batch use, sealed with screw cap + inner plug
- 5kg/10kg HDPE paper drum:** Industrial/Food/Feed medium-batch use, inner plastic lining + moisture-proof seal
- 25kg HDPE paper drum/jumbo bag:** Industrial/Food/Feed/Pharm bulk use, double inner lining + nitrogen-filled packaging (for long-term storage)

7. Safety & Protection

- The product is a **non-hazardous solid** with only mild respiratory irritation from high-concentration dust inhalation; no skin/eye irritation, no fire/explosion risk; all operations can be conducted with basic safety precautions.
- Wear dust mask (N95), safety goggles and nitrile rubber gloves for bulk handling/large-scale production to avoid inhaling dust; no special PPE required for small-batch operation.
- Operate in a well-ventilated area with local dust extraction system for industrial production; no special ventilation required for routine use.