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Technical Data Sheet (TDS)

- 4-Methoxybenzaldehyde
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1. Product Overview

- **Product Name**: 4-Methoxybenzaldehyde (4 - 甲氧基苯甲醛)
- **English Synonyms**: p-Anisaldehyde; p-Methoxybenzaldehyde; Anisic aldehyde
- **CAS Number**: 123-11-5
- **Molecular Formula**: $C_8H_8O_2$
- **Molecular Weight**: 136.15 g/mol
- **Form**: Colorless to pale yellow transparent liquid with a strong, sweet anise-like aromatic odor
- **Grade**: Food/Flavor Grade | Cosmetic Grade | Pharmaceutical Intermediate Grade | Industrial Grade

4-Methoxybenzaldehyde (p-Anisaldehyde) is a high-purity aromatic aldehyde, naturally present in anise, star anise and fennel essential oils. It complies with EU REACH, US FDA GRAS, FEMA and Chinese national food/cosmetic/pharmaceutical standards. Featured with pure anise aroma, excellent chemical stability and reactivity, it is a core raw material for flavor & fragrance formulation, and an important intermediate for pharmaceutical, pesticide and fine chemical synthesis, with wide applications in food, cosmetic, medicine and chemical industries.

2. Technical Specifications (Complies with Flavor/Pharm/Industrial Standard)

Item	Specification
Appearance	Colorless to pale yellow clear liquid, typical anise-like aroma
Assay (4-Methoxybenzaldehyde)	≥ 99.0%
Refractive Index (n_{20}^{D})	1.573 ~ 1.577
Relative Density (25/25℃)	1.118 ~ 1.122 g/cm³
Boiling Point	246 ~ 248℃
Flash Point (Closed Cup)	≥ 115℃
Melting Point	2 ~ 3℃
Acid Value (as KOH)	≤ 1.0 mg KOH/g
Water Content	≤ 0.1%
Heavy Metals (Pb)	≤ 5 ppm
Heavy Metals (As)	≤ 1 ppm
Ethanol Solubility (1:3, 95% EtOH)	Clear, no turbidity
Total Bacterial Count (Food/Cosmetic Grade)	≤ 100 CFU/mL
E. coli (Food/Cosmetic Grade)	Negative
Temperature Stability	Stable at 0 ~ 50℃ (purity/aroma retention ≥ 99%)
Storage Stability	24 months unopened (under specified conditions), no obvious discoloration

3. Product Advantages

1. **High Purity & Pure Aroma**: Assay ≥99.0%, no off-flavor, strong and authentic anise-like aroma, ideal for flavor/fragrance blending and fragrance fixing.
2. **Excellent Chemical Properties**: Good thermal stability under normal use; high reactivity with nucleophiles, suitable for various organic synthesis reactions.
3. **Wide Compatibility**: Miscible with ethanol, ether, acetone, ethyl acetate, essential oils and most organic solvents, compatible with all flavor/fragrance and cosmetic bases.
4. **Multi-grade Compliance**: Food grade meets FEMA 2099 & FDA GRAS; pharmaceutical grade complies with USP/EP standards; industrial grade meets chemical synthesis requirements.
5. **Natural Source Traceable**: Exists in natural aromatic plants, suitable for natural flavor and cosmetic formulation needs.

6. **Dual Application**: Serves as both aroma ingredient and key synthetic intermediate, with diversified application scenarios in daily chemical and fine chemical fields.

4. Application Fields

- **Food & Beverage Industry**: Flavoring agent for candy, pastry, beverage, dairy products and condiments; used to prepare anise, licorice, vanilla and fruit flavors, also as a fragrance fixative.
- **Cosmetic & Personal Care**: Fragrance ingredient for perfume, soap, shampoo, body wash and candle; enhances the sweet aromatic note of cosmetic formulations.
- **Flavor & Fragrance Industry**: Core raw material for synthetic anise essential oil; blending ingredient for daily chemical and fine fragrances, improves aroma layering.
- **Pharmaceutical Synthesis**: Key intermediate for synthesizing antihistamines, antispasmodics, antibiotics and other pharmaceutical raw materials.
- **Organic Chemical Manufacturing**: Intermediate for pesticide, dye, plasticizer and surfactant synthesis; chemical reagent for organic qualitative analysis (aldehyde group detection).
- **Other Fields**: Raw material for synthetic resin modification; odor modifier for industrial coatings and inks.

5. Usage Methods

Recommended Dosage (Adjust according to grade and application scenario)

- **Food & Beverage**: 0.0005 ~ 0.02% of total formulation (beverage/dairy); 0.01 ~ 0.05% (candy/pastry); follow FEMA maximum use level.
- **Cosmetic & Fragrance**: 0.1 ~ 4.0% of total formulation (perfume/candle); 0.05 ~ 1.0% (shampoo/body wash).
- **Flavor & Fragrance**: 3 ~ 15% of total essence formulation (as aroma ingredient/fragrance fixative).
- **Pharm/Organic Synthesis**: 5 ~ 60% of total reaction system (as intermediate), adjust according to reaction process.

Key Application Tips

1. **Mixing & Addition**: At room temperature, can be directly mixed with organic solvents/oil-based formulations; dilute with ethanol/propylene glycol for water-based formulations to avoid phase separation.
2. **Compatibility Note**: Stable in neutral/weak acidic systems (pH 4.0 ~ 7.0); avoid strong alkaline (pH >9.0) and strong oxidizing environments to prevent oxidation/decomposition.
3. **Fragrance Blending**: Blends well with linalool, vanillin, cinnamon aldehyde and citrus essential oils, enhancing the sweet and aromatic note of formulations.
4. **Synthesis Use**: For organic synthesis, control reaction temperature at 0 ~ 80℃; add antioxidant in trace amount for long-term storage to prevent oxidation.

6. Packaging & Storage

Packaging Specifications (Sealed Food/Pharm/Industrial Grade Packaging)

- 500 mL brown glass bottle (inner) + carton (outer) (laboratory/R&D/small-batch use)
- 25 kg HDPE plastic drum (cosmetic/industrial grade use)
- 200 kg galvanized iron drum (flavor/food/pharm grade bulk use)
- 1000 kg IBC tote (large-scale chemical/pharmaceutical manufacturing use)
- Custom packaging available (100g/250g small glass bottle for flavor formulation).

Storage Conditions

1. Store in a **cool, dark, well-ventilated warehouse** at 5 ~ 30℃; avoid direct sunlight, high temperature (>35℃) and open fire.
2. Keep the container tightly sealed with an airtight cover to prevent product volatilization, oxidation and discoloration.
3. Store separately from strong oxidants, strong alkalis, acids and halogens; isolation distance ≥1.5m; no smoking in the storage area.

7. Safety & Protection

1. The product is low-toxic and slightly irritating; a small number of sensitive individuals may have mild skin/eye irritation after direct contact; avoid prolonged contact and inhalation of high-concentration vapor.