

Technical Data Sheet (TDS)

- Gamma-Valerolactone 伽马 - 缬罗内酯

Revision Date: 20 FEB 2026

1. Product Overview

- **Product Name:** Gamma-Valerolactone (伽马 - 缬罗内酯)
 - **English Name:** Gamma-Valerolactone; GVL; 5-Methyl-2-oxolanone
 - **CAS Number:** 108-29-2
 - **Molecular Formula:** C₅ H₈ O₂
 - **Molecular Weight:** 100.12 g/mol
 - **Form:** Colorless transparent liquid with a mild, sweet coconut-cream aromatic odor
 - **Grade:** Food Grade / Flavor & Fragrance Grade / Industrial Grade / Green Solvent Grade
- Gamma-Valerolactone is a high-purity cyclic ester organic compound with excellent physical and chemical properties, including good solubility, thermal stability and biodegradability. It complies with EU REACH, US FDA GRAS, FEMA and Chinese national food/cosmetic safety standards. The product is a classic aroma ingredient in the flavor & fragrance industry, and also a green and environment-friendly solvent/ organic synthesis intermediate widely used in chemical manufacturing, biomass conversion and fine chemical production, with stable performance and wide application prospects.

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

Item	Specification
Appearance	Colorless clear liquid, mild coconut-cream aroma
Assay (Gamma-Valerolactone)	≥ 99.0%
Refractive Index (n ₂₀ ^D)	1.430 ~ 1.434
Relative Density (25/25°C)	1.040 ~ 1.044 g/cm ³
Boiling Point	205 ~ 207°C
Flash Point (Closed Cup)	≥ 45°C
Acid Value (as KOH)	≤ 0.5 mg KOH/g
Water Content	≤ 0.1%
Heavy Metals (Pb)	≤ 5 ppm
Heavy Metals (As)	≤ 1 ppm
Ethanol Solubility (1:10, 95% EtOH)	Clear, no turbidity
Total Bacterial Count (Food/Flavor Grade)	≤ 100 CFU/mL
E. coli (Food/Flavor Grade)	Negative
Temperature Stability	Stable at -10 ~ 60°C (purity/aroma retention ≥ 99%)
pH Stability	Stable at pH 4.0 ~ 8.0 (no hydrolysis)
Storage Stability	24 months unopened (under specified conditions), no discoloration/odor change

3. Product Advantages

1. **High Purity & Pure Aroma:** Assay ≥99.0%, no off-flavor, pure sweet coconut-cream note, excellent fragrance fixing and blending effect in flavor formulations.
2. **Excellent Solubility:** Miscible with water, ethanol, ether, ester and most organic solvents, ideal green solvent for chemical reaction and formulation.
3. **Good Stability:** Thermal and chemical stability, no easy hydrolysis/decomposition under normal use conditions, no secondary reaction in organic synthesis.
4. **Environmentally Friendly:** Fully biodegradable, low environmental impact, meets global green chemical standards, replace traditional toxic solvents.
5. **Multi-grade Compliance:** Food grade meets FEMA 3103, FDA GRAS; industrial grade complies with EU REACH and Chinese chemical product standards, low toxicity and safe use.



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6. **Versatile Application:** Dual properties of aroma ingredient and chemical intermediate, suitable for flavor & fragrance, organic synthesis, biomass energy and other fields.

4. Application Fields

- **Food & Flavor Industry:** Flavoring agent for candy, pastry, ice cream, beverage, dairy products and baked food; used to prepare coconut, cream, vanilla and fruit flavors, also as fragrance fixative.
- **Cosmetic & Personal Care:** Fragrance ingredient for perfume, lotion, cream, shampoo and body wash; enhances the sweet milk/coconut note of cosmetic formulations.
- **Organic Synthesis:** Key intermediate for synthesizing pharmaceuticals, pesticides, fine chemicals and polymer materials; reaction solvent for esterification, hydrogenation and condensation reactions.
- **Green Solvent:** Substitute for traditional organic solvents (e.g., acetone, ethyl acetate) in coating, ink, adhesive and biomass conversion industry, low VOC and environmental friendly.
- **Other Fields:** Additive for synthetic lubricating oil and plasticizer; raw material for battery electrolyte and biomass fuel production.

5. Usage Methods

Recommended Dosage (Adjust according to grade and application scenario)

- **Food & Beverage:** 0.005 ~ 0.05% of total formulation (dairy/beverage); 0.01 ~ 0.1% (candy/pastry); follow FEMA maximum use level.
- **Flavor & Fragrance:** 3 ~ 15% of total essence formulation (as aroma ingredient/fragrance fixative).
- **Organic Synthesis:** 20 ~ 80% of total reaction system (as solvent/intermediate), adjust according to reaction process.
- **Green Solvent:** 50 ~ 100% of formulation (coating/ink), replace traditional solvents in equal volume.

Key Application Tips

1. **Mixing & Addition:** At room temperature, can be directly mixed with water/organic solvents without dilution; for high-temperature synthesis reactions, control temperature below 150°C to avoid slight volatilization.
2. **Compatibility Note:** Stable in neutral/weak acidic/weak alkaline systems (pH 4.0 ~ 8.0); avoid strong acidic/strong alkaline (pH <3.0 or pH >9.0) high-temperature environments to prevent hydrolysis.
3. **Fragrance Blending:** Blends well with vanillin, ethyl maltol, coconut aldehyde and milk flavor ingredients to enhance the layering and persistence of sweet aroma.
4. **Solvent Use:** Can be mixed with water in any proportion, suitable for water-based and oil-based formulations, no phase separation after mixing.

6. Packaging & Storage

Packaging Specifications (Sealed Food/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 grade bulk use)
- 1000 kg IBC tote (large-scale chemical manufacturing/green solvent use)
- Custom packaging available (100g/250g small glass bottle for flavor formulation).

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.
2. **Recommended PPE:** Wear nitrile rubber gloves and safety glasses for large-scale handling/pouring; a dust/mist mask is optional for operation in poor ventilation; no special PPE for small-batch formulation.
3. **Accident Treatment:**
 - Skin Contact: Rinse the affected area with plenty of running water for 5 minutes; wipe with a mild moisturizer if irritation occurs.