Safety Data Sheet (MSDS)

- Eugenol

*(According to GB/T 16483 and GB/T 17519; Adapts to GHS, IMDG, IATA Standards)***Revision Date**: 26 FEB 2026

SECTION 1: Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Identifiers

- Product Name: Eugenol
- Product Number: EUG-20260226
- Brand: SIGALD
- CAS-No.: 97-53-0
- Synonyms: 2-Methoxy-4-(2-propenyl)phenol; Clove oil phenol; 4-Allyl-2-methoxyphenol
- Formula: $C_{10}H_{12}O_2$
- Molecular Weight: 164.20 g/mol

1.2 Details of the supplier of the safety data sheet

- Company: NEWAY SINOPHC TECH. LIMITED
- Address: RM. 204, BUILDING 3, NO. 188, AONA RD., CHINA (SHANGHAI) PILOT FREE TRADE ZONE.
- Telephone: +86-021-50350029
- Fax: +86-021-50350029

1.3 Emergency telephone

- Emergency Phone #: +86-021-50350029 (CHEMTREC)

1.4 Relevant Identified Uses and Uses Advised Against

- **Identified Uses**: Fragrance & flavor manufacturing; cosmetic & personal care formulations; pharmaceutical intermediate; dental antiseptic raw material; food flavoring agent; organic synthesis.
- **Uses Advised Against**: Not for undiluted direct skin contact in large quantities; avoid use in high-temperature processes (>220℃) without stabilizers; not for use in children's cosmetics in high concentration.

SECTION 2: Hazards Identification

2.1 GHS Classification

- Skin Irritation (Category 2)
- Eye Irritation (Category 2)
- Skin Sensitization (Category 1)
- Hazardous to the aquatic environment - Acute (Category 3)
- Hazardous to the aquatic environment - Chronic (Category 3)

2.2 GHS Label Elements

- Hazard Pictogram: (Exclamation mark), (Environment)
- Signal Word: **Warning**
- **Hazard Statements**:
  - H315: Causes skin irritation
  - H317: May cause an allergic skin reaction
  - H319: Causes serious eye irritation
  - H412: Harmful to aquatic life with long lasting effects
- **Precautionary Statements**:
  - P261: Avoid breathing dust/fume/gas/mist/vapors/spray
  - P264: Wash hands thoroughly after handling
  - P272: Contaminated work clothing should not be allowed out of the workplace
  - P273: Avoid release to the environment

- P280: Wear protective gloves/eye protection/face protection
- P302+P352: If on skin: Wash with plenty of soap and water
- P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P333+P313: If skin irritation or rash occurs: Get medical advice/attention
- P337+P313: If eye irritation persists: Get medical advice/attention
- P362+P364: Take off contaminated clothing and wash it before reuse
- P391: Collect spillage

2.3 Physical and Chemical Hazards

- Combustible liquid (flash point ≥110℃); slow oxidation upon prolonged air/UV light contact; may undergo polymerization at high temperature (>250℃); no explosion risk under normal use conditions.

2.4 Health Hazards

- **Acute**: Moderate skin and severe eye irritation; inhalation of high-concentration vapors causes mild respiratory tract discomfort and cough; may trigger allergic skin reactions in sensitive individuals.
- **Chronic**: Prolonged or repeated contact may cause persistent skin sensitization; no other known chronic toxic effects with normal occupational exposure.

2.5 Environmental Hazards

- Harmful to aquatic organisms with long-lasting effects; low bioaccumulation potential in the food chain; partially biodegradable in aerobic aquatic environments.

2.6 Other Hazards

- No additional hazards identified.

SECTION 3: Composition/Information on Ingredients

- **Substance / Mixture**: Pure Substance
- **Active Ingredient**: Eugenol (97-53-0), Concentration: 99.0-99.8% (w/w)
- No hazardous impurities present above threshold limits.

SECTION 4: First Aid Measures

4.1 Description of First-Aid Measures

- **If Inhaled**: Move victim to fresh air and keep at rest in a position comfortable for breathing. No special treatment required if no discomfort; consult a doctor if respiratory symptoms persist or worsen.
- **In Case of Skin Contact**: Immediately remove contaminated clothing and shoes. Wash skin with plenty of soap and running water for 10-15 minutes. If irritation or allergic rash occurs, avoid further contact and seek medical advice.
- **In Case of Eye Contact**: Rinse eyes thoroughly with plenty of running water for 15-20 minutes, holding eyelids open. Remove contact lenses if present and easy to do. Immediately consult an ophthalmologist even if irritation is mild.
- **If Swallowed**: Rinse mouth with water. Do not induce vomiting. If large quantity is swallowed or gastrointestinal discomfort (nausea, stomach pain) occurs, seek medical attention immediately and show the product label/MSDS.

4.2 Most Important Symptoms and Effects

- **Acute**: Skin redness, itching, burning; eye redness, tearing, blurred vision; mild cough, sore throat (high-concentration inhalation); mild nausea (ingestion).
- **Delayed**: Allergic skin reaction may appear 24-48 hours after contact.

4.3 Indication of Immediate Medical Attention

- Seek medical help immediately for eye contact, severe skin irritation/allergic reaction, persistent respiratory symptoms, or accidental ingestion of large quantities.

SECTION 5: Firefighting Measures

5.1 Extinguishing Media

- **Suitable**: Water spray (cool container), dry chemical powder, foam, carbon dioxide (CO_2).
- **Unsuitable**: No unsuitable extinguishing media identified.

5.2 Special Hazards Arising from the Substance

- Combustion may produce minor toxic fumes (carbon monoxide, carbon dioxide, aromatic phenol byproducts); no hazardous polymerization products under fire conditions.
- No explosive decomposition under fire conditions.

5.3 Advice for Firefighters

- Wear self-contained breathing apparatus (SCBA) and full fire-fighting protective gear when fighting large-scale fires.
- Cool exposed containers with water spray continuously to prevent thermal expansion and leakage.
- Fight fire from a safe distance; avoid inhalation of combustion fumes and direct contact with hot liquid.

SECTION 6: Accidental Release Measures

6.1 Personal Precautions

- Wear nitrile rubber gloves, chemical safety goggles, protective clothing and a half-face respirator with organic vapor cartridge. Avoid breathing vapors, eye contact or skin contact. Ensure good ventilation in the spill area.
- Evacuate non-essential personnel from the affected area if large spills occur.

6.2 Environmental Precautions

- Prevent spillage from entering drains, sewers, rivers, lakes or other water bodies. Contain runoff with sand or inert absorbent if necessary.
- Do not discharge contaminated water into the environment without treatment.

6.3 Methods and Materials for Containment and Cleaning Up

- **Small Spill**: Absorb with inert material (sand, diatomaceous earth, vermiculite). Place absorbed material in sealed plastic bags for proper disposal. Wipe the area with ethanol/water mixture and ventilate until vapor dissipates.
- **Large Spill**: Contain with dikes or bunds to prevent spreading. Transfer the liquid to a sealed, labeled container using a pump. Dispose of waste in accordance with local, national and international regulations.

6.4 Reference to Other Sections

For disposal, see Section 13; for personal protection, see Section 8.

SECTION 7: Handling and Storage

7.1 Precautions for Safe Handling

- Operate in a well-ventilated area; avoid generating vapors or aerosols (e.g., excessive stirring, spraying). Add antioxidants (e.g., BHT) if storing for long periods or using in high-temperature processes.
- Do not eat, drink or smoke while handling the product. Wash hands and face thoroughly with soap and water after use.
- Avoid skin contact, eye contact and prolonged inhalation of vapors; avoid contact with air, UV light and open flame for extended periods.

7.2 Conditions for Safe Storage

- **Storage Temperature**: 5-25℃ (cool, dark place); avoid extreme heat and direct sunlight/UV light.
- **Container**: Sealed dark glass or HDPE plastic containers; fill to minimize headspace (air contact) and keep tightly closed when not in use.

- **Incompatibilities**: Strong oxidizing agents, strong acids, strong bases, halogens, anhydrides, heavy metal salts.
- **Storage Class (TRGS 510)**: 10 (Combustible Organic Liquids)
- **Shelf Life**: 24 months (unopened, under specified conditions with antioxidant); 12 months without antioxidant.

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

- **Occupational Exposure Limit (OEL)**:
  - EU TWA: 5 ppm (34 mg/m³), STEL: 10 ppm (68 mg/m³)
  - US ACGIH TWA: 10 ppm (68 mg/m³)
  - No official China MAC limit; recommended TWA: 5 ppm (34 mg/m³)

8.2 Exposure Controls

- **Engineering Controls**: Local exhaust ventilation (LEV) for large-scale handling; general ventilation for routine use to maintain vapor concentration below OEL.
- **Personal Protective Equipment (PPE)**:
  - **Eye/Face Protection**: Chemical safety goggles (routine handling); face shield (spill or splash risk) – mandatory for all handling operations.
  - **Skin Protection**: Nitrile rubber gloves (thickness ≥ 0.11 mm), chemical-resistant lab coat/overalls; replace gloves if damaged or contaminated.
  - **Respiratory Protection**: Half-face respirator with organic vapor cartridge if vapor concentration exceeds OEL or ventilation is poor; no respiratory protection needed under normal use conditions.
  - **Hygiene**: Change contaminated clothing immediately; launder separately before reuse; avoid touching face/eyes during handling.

SECTION 9: Physical and Chemical Properties

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Property	Value	Unit	Test Method
Physical State	Liquid	-	Visual Inspection
Color	Colorless to pale yellow	-	Visual Inspection
Odor	Strong clove-like, spicy floral, warm balsamic	-	Sensory Evaluation
Boiling Point	253-255	℃	Distillation Method
Flash Point (Closed Cup)	118	℃	Pensky-Martens Method
Autoignition Temperature	> 370	℃	ASTM E659
Relative Density (20/20℃)	1.062-1.068	g/cm³	Hydrometer Method
Refractive Index (20℃)	1.538-1.544	-	Abbe Refractometer
Viscosity (25℃)	6-8	mPa·s	Rotational Viscometer
Water Solubility	Slightly soluble (≈2.5 g/L at 20℃)	g/L	Shake Flask Method
Solubility	Miscible with ethanol, ether, acetone, vegetable oils, essential oils	-	Visual Inspection
Vapor Pressure (25℃)	< 0.01	hPa	Static Method

Property	Value	Unit	Test Method
Flammability	Combustible	-	Closed Cup Flash Point
Explosive Limits	0.8-7.9 (v/v)	%	ASTM E681
Oxidation Risk	May oxidize (air/UV light, no antioxidant)	-	Visual Observation

SECTION 10: Stability and Reactivity

10.1 Chemical Stability

- Stable under normal storage and use conditions (5-25℃, sealed, dark, with antioxidant); prone to slow oxidation upon prolonged contact with air/UV light without antioxidant, leading to slight color darkening and odor change.

10.2 Possibility of Hazardous Reactions

- No hazardous reactions under normal use; may react vigorously with strong oxidizing agents, strong acids and strong bases; may polymerize at high temperature (>250℃) without stabilizers.

10.3 Conditions to Avoid

- High temperature (>100℃), direct sunlight/UV light, open flame, prolonged air contact, contact with incompatible materials.

10.4 Incompatible Materials

- Strong oxidizers (hydrogen peroxide, potassium permanganate, chlorine), concentrated sulfuric acid, sodium hydroxide, halogens (Cl_2, Br_2), acid anhydrides, heavy metal salts (Fe^{3+}, Cu^{2+}).

10.5 Hazardous Decomposition Products

- Under high temperature/combustion: Carbon monoxide (CO), carbon dioxide (CO_2), aromatic phenol byproducts; under oxidation: Corresponding quinone compounds (no toxic decomposition products).

SECTION 11: Toxicological Information

11.1 Information on Toxicological Effects

- **Acute Toxicity**:
  - Oral (Rat, LD_{50}): 2600 mg/kg
  - Dermal (Rabbit, LD_{50}): > 5000 mg/kg
  - Inhalation (Rat, LC_{50}): > 2500 mg/m³ (4h exposure)
- **Skin Corrosion/Irritation**: Moderate irritation (Rabbit, 4-hour exposure; reversible within 72h).
- **Serious Eye Damage/Eye Irritation**: Severe irritation (Rabbit, 24-hour exposure; reversible within 72h).
- **Skin Sensitization (Guinea Pig)**: Positive – may cause allergic contact dermatitis in humans.
- **Respiratory Irritation**: Mild irritation at high concentrations (cough, sore throat); no respiratory sensitization.
- **Carcinogenicity**: Not classified as carcinogenic by IARC, EPA, NTP or EU.
- **Reproductive Toxicity**: No adverse reproductive effects in animal studies at normal use doses.
- **Specific Target Organ Toxicity**: No target organ toxicity with normal exposure.
- **Aspiration Hazard**: Low (liquid, low vapor pressure, moderate viscosity).

SECTION 12: Ecological Information

- **Aquatic Toxicity**:
  - Zebrafish LC_{50} (96h): 220 mg/L
  - Daphnia EC_{50} (48h): 180 mg/L
  - Algae EC_{50} (72h): 260 mg/L
- **Persistence and Degradability**: Partially biodegradable (BOD_5/COD = 0.52) in aerobic aquatic environments; degrades by 55-65% within 28 days.

- **Bioaccumulative Potential**: Log Koc = 2.90, Log Kow = 2.75 – **low bioaccumulation potential**; no significant biomagnification in food chain.
- **Mobility in Soil**: Low mobility; adsorbs to soil organic matter and clay particles.
- **Other Adverse Effects**: Harmful to aquatic organisms with long-lasting effects; no known adverse effects on terrestrial ecosystems at normal use levels.

SECTION 13: Disposal Considerations

13.1 Waste Treatment Methods

- **Product Waste**: Dispose of through licensed hazardous waste treatment facilities. Incineration is recommended (with proper emission control for aromatic combustion fumes). Small quantities (with antioxidant) may be diluted and treated in biological wastewater treatment systems (industrial facilities with valid permits).
- **Packaging Waste**: Rinse packaging thoroughly with ethanol or water; dispose of as hazardous waste or recycle (if permitted by local regulations). Do not reuse contaminated packaging.
- **Oxidized/Polymerized Residue**: Dispose of as solid hazardous waste; do not mix with other waste streams.
- **General Note**: Comply with local, national and international waste disposal regulations; do not discharge directly into the environment.

SECTION 14: Transport Information

14.1 UN Number & Shipping Name

- ADR/RID: 3082, **Environmentally hazardous substances, liquid, n.o.s.** (Eugenol)
- IMDG: 3082, **Environmentally hazardous substances, liquid, n.o.s.**
- IATA-DGR: 3082, **Environmentally hazardous substances, liquid, n.o.s.**

14.2 Transport Hazard Class

- ADR/RID: 9; IMDG: 9; IATA-DGR: 9

14.3 Packaging Group

- III (Minor hazard)

14.4 Environmental Hazards

- IMDG Marine Pollutant: **Yes (P-Symbol)**; ADR/RID: Environmentally hazardous.

14.5 Special Transport Precautions

- Transport in sealed, dark glass/HDPE plastic containers; avoid direct sunlight, heat, UV light and collision during transport. Add antioxidant (BHT) for long-distance transport.
- Do not transport with strong oxidizers, strong acids, strong bases, halogens, food or food additives.
- Label containers with GHS hazard pictograms, product identification, UN number, "Contains Antioxidant" (if applicable) and skin/eye irritant/skin sensitizer warnings.
- Transport by licensed hazardous chemical carriers in accordance with national and international transport regulations.

SECTION 15: Regulatory Information

15.1 National & International Regulations

- **China**: Complies with *Hazardous Chemical Safety Management Regulation*; listed in *National Cosmetic Raw Material Directory* and *National Food Additive Standard (GB 2760)*; approved for dental medical auxiliary use.
- **EU (REACH)**: Registered on REACH Inventory; no SVHC (Substances of Very High Concern) classification; compliant with Cosmetics Regulation (EC 1223/2009) and Flavoring Regulation (EC 1334/2008).
- **US (TSCA)**: Listed on TSCA Inventory; compliant with FDA regulations for cosmetic, food flavor and dental medical use (21 CFR); labeled as skin/eye irritant and skin sensitizer per OSHA standards.

- **IFRA**: Compliant with International Fragrance Association (IFRA) standards (maximum use level specified in cosmetics and fragrances).
- **GHS**: Classified in accordance with GHS Rev. 9.

15.2 Other Regulations

- Comply with local air and water pollution prevention and control laws; occupational exposure must meet national/international OEL standards; mandatory labeling for skin/eye irritation and skin sensitization in all regions; comply with dental medical device raw material quality standards for pharmaceutical use.

SECTION 16: Other Information

- This MSDS is based on current scientific and technical knowledge, complying with GB/T 16483, GB/T 17519 and international GHS (Rev.9), ADR/RID, IMDG and IATA-DGR standards.
- The supplier is not liable for any damage caused by improper handling, storage, use (e.g., without antioxidant, undiluted skin/eye contact, high-temperature use) or non-compliance with the safety precautions stated in this MSDS.