Safety Data Sheet (MSDS)

(According to GB/T 16483 and GB/T 17519; Adapts to GHS, IMDG, IATA Standards)

1,3-DAPDM (1,3-Diaminopropane Dimaleate)

Revision Date: 28 FEB 2026

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

1.1 Product Identifiers

- Product Name: 1,3-DAPDM (1,3-Diaminopropane Dimaleate)
- Product Number: DAPDM-20260228
- Brand: SIGALD
- CAS-No.: 109-76-2 (1,3-Diaminopropane); 110-16-7 (Maleic Acid)
- Synonyms: 1,3-Propanediamine dimaleate; 1,3-Diaminopropane bis(maleate)
- EINECS/EC-No.: 203-701-8 (1,3-Diaminopropane); 203-742-5 (Maleic Acid)

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: Organic synthesis intermediate; epoxy resin curing agent (coating/adhesive industry); raw material for polyamide/polyurethane resins; chelating agent for metal ion treatment.
- Uses Advised Against: Not for direct oral consumption; avoid use on skin/mucous membrane; no use as food/cosmetic additive or pharmaceutical raw material.

SECTION 2: Hazards Identification

|Summary of Emergency Measures| White crystalline powder with slight acidic amine odor. Causes skin irritation and serious eye irritation; may cause mild respiratory irritation if inhaled as dust; mild gastrointestinal discomfort if swallowed. After inhalation: Move to fresh air, rest if coughing occurs. In case of skin contact: Rinse with plenty of water for 10 minutes. After eye contact: Rinse with plenty of water for 15 minutes and call a doctor immediately. After swallowing: Rinse mouth with water, do not induce vomiting; seek medical advice if nausea occurs. Non-flammable, no explosion risk under normal conditions.| |---|

2.1 GHS Classification

- Skin irritation (Category 2)
- Serious eye irritation (Category 2A)
- Respiratory irritation (Category 3)

2.2 GHS Label Elements

- Hazard Pictogram: (Exclamation mark)
- Signal Word: **Warning**
- Hazard Statements:
  - H315: Causes skin irritation
  - H319: Causes serious eye irritation
  - H335: May cause respiratory irritation
- Precautionary Statements:
  - P261: Avoid breathing dust/fume/gas/mist/vapors/spray
  - P264: Wash skin thoroughly after handling
  - P270: Do not eat, drink or smoke when using this product
  - P280: Wear protective gloves/eye protection/face protection
  - P302+P352: If on skin: Wash with plenty of water and soap
  - P305+P351+P338+P310: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/physician
  - P304+P340: If inhaled: Remove person to fresh air and keep comfortable for breathing
  - P333+P313: If skin irritation or rash occurs: Get medical advice/attention
  - P362+P364: Take off contaminated clothing and wash it before reuse
  - P501: Dispose of contents/container to an approved waste disposal plant

2.3 Physical and Chemical HazardsNon-flammable solid; no explosive or oxidizing properties under normal conditions; high temperature (>180℃) causes thermal decomposition to produce mild irritating amine and carboxylic acid gases; dust has no explosion risk under normal use; stable under recommended storage conditions; incompatible with strong oxidizing agents and strong bases.

2.4 Health Hazards

- Acute: Mild skin redness/itching upon contact; severe eye redness/tearing/blurred vision; inhalation of high-concentration dust causes cough/throat irritation; accidental swallowing causes mild nausea/abdominal pain.
- Chronic: Prolonged repeated skin contact may cause mild chronic dermatitis; no permanent organ damage with standard protective measures; no known carcinogenic or mutagenic effects.

2.5 Environmental HazardsLow acute toxicity to aquatic organisms; partially biodegradable in natural environment; low bioaccumulation potential; no persistent environmental residues; avoid direct discharge into water bodies in large quantities.

2.6 Other HazardsReacts with strong oxidizing agents to produce toxic nitrogen oxides; contact with strong bases releases free 1,3-diaminopropane with pungent amine odor.

SECTION 3: Composition/Information on Ingredients

- Substance / Mixture: **Pure Substance** | 3.1 Main Component | 1,3-Diaminopropane Dimaleate | | --- | --- | | Formula | $C_{11}H_{18}N_2O_8$ ($C_3H_{10}N_2 \cdot 2C_4H_4O_4$) | | Molecular Weight | 306.26 g/mol | | CAS-No.: | 109-76-2/110-16-7 | | EC-No.: | 203-701-8/203-742-5 |

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Component	Classification	Concentration (w/w)
1,3-Diaminopropane Dimaleate	Skin Irrit.2; Eye Irrit.2A; Resp. Irrit.3	≥98.0%

SECTION 4: First Aid Measures

4.1 Description of First-Aid Measures

- If Inhaled: Move victim to fresh air immediately, keep in a comfortable breathing position. Loosen tight clothing; provide oxygen if breathing is difficult. Do not induce coughing; consult a doctor if cough or throat irritation persists for more than 24 hours.
- In Case of Skin Contact: Remove all contaminated clothing, gloves and accessories immediately. Rinse affected skin with plenty of running water and mild neutral soap for at least 10 minutes. Pat dry gently; do not apply ointment without medical advice. Seek medical attention if redness or rash worsens.
- In Case of Eye Contact: **Immediate and thorough flushing is critical**. Hold eyelids open and rinse thoroughly with clean running water for at least 15 minutes, ensuring water flushes the entire eye surface (including under the eyelid). Do not rub eyes; remove contact lenses only if easy to do without additional damage. **Call an ophthalmologist immediately** regardless of symptoms.
- If Swallowed: Rinse mouth with plenty of clean water (do not swallow). Do not induce vomiting (risk of mucosal irritation). If conscious and alert, drink a small amount of water to dilute; **call a POISON CENTER or doctor immediately** even if no symptoms are present.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed

- Acute: Skin erythema/pruritus; eye redness/tearing/blurred vision; mild cough/throat irritation (inhalation); oral/mucous membrane irritation, nausea (swallowing).
- Delayed: Mild skin peeling (1-2 days after contact); persistent eye redness (up to 72 hours) in sensitive individuals; no known long-term delayed toxic effects.

4.3 Indication of Any Immediate Medical Attention and Special Treatment NeededAll eye contact cases require **immediate professional medical attention**; severe skin irritation with blistering and large-dose swallowing require urgent medical treatment; no specific antidote, treat symptomatically (e.g., eye irrigation, anti-irritation medication).

SECTION 5: Firefighting Measures

5.1 Extinguishing Media

- Suitable: Water spray (cooling and dust suppression), carbon dioxide (CO_2), dry chemical powder, foam.
- Unsuitable: No limitations of extinguishing agents; avoid direct high-pressure water jet to prevent dust spread.

5.2 Special Hazards Arising from the Substance or MixtureNon-combustible solid; high temperature (>180℃) thermal decomposition produces low-toxic irritating gases (amine, carboxylic acid, carbon dioxide); no explosive decomposition during fire; dust may cause mild respiratory irritation to firefighters; no toxic metal fumes generated.

5.3 Advice for FirefightersWear self-contained breathing apparatus (SCBA) and full fire-fighting protective gear if thermal decomposition gases are present. Keep containers cool with water spray during fire to prevent decomposition. Evacuate to upwind areas; avoid inhaling decomposition fumes. Prevent fire-extinguishing water from entering municipal sewers or natural water bodies.

SECTION 6: Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency ProceduresWear nitrile rubber gloves, chemical-resistant safety goggles, and a half-face air-purifying respirator with dust cartridges for large spills. Ensure good ventilation at the spill site; evacuate non-essential personnel and set up a warning zone. Avoid inhaling dust and direct skin/eye contact; do not walk through spilled powder.

6.2 Environmental PrecautionsPrevent spilled powder from entering sewers, rivers, lakes, soil or storm drains. Cover spilled powder with plastic sheeting to avoid spreading with wind; do not wash spilled powder into drains with large amounts of water.

6.3 Methods and Materials for Containment and Cleaning Up

- Small Spill: Gently sweep up the powder with a dry broom and collect into a sealed HDPE container with hazard labels; wipe the spill area with a dry cloth and dispose of the cloth in the same container.
- Large Spill: Contain the powder with sandbags or plastic sheeting, collect with a dry explosion-proof vacuum cleaner into sealed HDPE drums; neutralize residual dust with weak alkaline solution (sodium bicarbonate) before final cleaning.6.4 Reference to Other SectionsFor waste disposal, see Section 13; for personal protection, see Section 8.

SECTION 7: Handling and Storage

7.1 Precautions for Safe HandlingOperate in a well-ventilated area with local exhaust ventilation (to suppress dust); wear specified PPE for all operations. Avoid generating dust (gentle mixing, no violent shaking); dissolve in deionized water as directed, do not mix with strong oxidizing agents or strong bases. Do not eat, drink or smoke in the work area; wash hands, face and exposed skin thoroughly with soap and water after handling.

7.2 Conditions for Safe Storage

- Storage Conditions: Store in a **cool, dry, well-ventilated** warehouse. Temperature ≤25℃, relative humidity ≤60%. Keep the container tightly sealed to prevent moisture absorption and caking; store in original HDPE or amber glass containers. Store away from direct sunlight and heat sources.

- Incompatibilities: Strong oxidizing agents (H_2O_2, $KMnO_4$), strong mineral bases (NaOH, KOH), peroxides, strong acid anhydrides.
- Storage Class (TRGS 510): 9 (Miscellaneous Hazardous Substances)
- Shelf Life: **24 months (unopened, under specified storage conditions)**
- Segregation: Store separately from all incompatible materials; place in a dedicated hazardous substance storage area with anti-leakage trays; keep away from incompatible materials with a minimum distance of 1 meter; mark clear hazard labels on the storage area.

SECTION 8: Exposure Controls/Personal Protection

8.1 Control Parameters

- Occupational Exposure Limit (OEL) for 1,3-Diaminopropane: TWA 10 ppm (30 mg/m³, 8-hour, ACGIH); STEL 20 ppm (60 mg/m³, 15-minute, ACGIH)
- Biological Limit Value (BLV): N/A

8.2 Exposure Controls

- Engineering Controls: Local exhaust ventilation (LEV) with dust collection system for powder handling; dust-proof operation tables; humidity control in the work area (≤60%) to prevent caking.
- Personal Protective Equipment (PPE) - **MANDATORY for all operations**:
  - Eye/Face Protection: Chemical-resistant safety goggles (mandatory); full face shield for large-scale handling or spill cleanup.
  - Skin Protection: Nitrile rubber gloves (thickness ≥0.30 mm), chemical-resistant lab coat/apron, disposable arm sleeves; replace gloves immediately if damaged.
  - Respiratory Protection: Half-face air-purifying respirator with dust cartridges for routine operations; full-face SCBA for confined space or large spill emergency.
  - Other: Disposable dust mask for basic dust protection; clean work clothes after each use; no open-toed shoes in the work area.

SECTION 9: Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Propertiesa) Physical State: Crystalline solid (powder)b) Color: White to off-whitec) Odor: Slight acidic amine odor, no pungent smelld) Melting Point/Freezing Point: 175-180℃ (decomposes)e) Boiling Point: Decomposes (>180℃, no boiling)f) Flammability: Non-flammableg) Flammability Limits: Not applicableh) Flash Point: Not applicable (solid)i) Autoignition Temperature: Not applicablej) Decomposition Temperature: ≥180℃ (amine/carboxylic acid gases released)k) pH Value (5% aqueous, 25℃): 4.0-6.0l) Viscosity: Not applicable (solid powder)m) Solubility: Highly soluble in water (≥100 g/L, 25℃); soluble in methanol/ethanol; slightly soluble in propylene glycol; insoluble in ether/benzene/hexanen) Partition Coefficient (log P, n-octanol/water): -1.25 (25℃)o) Vapor Pressure (25℃): < 0.001 kPap) Bulk Density (25℃): 0.90-0.95 g/cm³q) Relative Vapor Density: N/A (solid)r) Explosive Properties: No explosive propertiess) Oxidizing Properties: None

9.2 Other Safety InformationAbsorbs slight moisture in high humidity environment, may cause mild caking (no effect on purity after drying); good water solubility, forms clear homogeneous solution without precipitation.

SECTION 10: Stability and Reactivity

10.1 Chemical Stability: Stable under the recommended storage and handling conditions (≤25℃, dry, sealed); no chemical changes under normal industrial processing conditions (≤100℃).10.2 Possibility of Hazardous Reactions: No hazardous reactions under normal use and processing conditions; reacts with strong oxidizing agents/strong bases to produce byproducts; decomposes at high temperature (>180℃); no hazardous polymerization occurs under any conditions.10.3 Conditions to Avoid: High temperature (>180℃), direct sunlight, high humidity (>60%), contact with incompatible materials, confined spaces with poor ventilation.10.4 Incompatible Materials: Strong oxidizing agents, strong mineral bases, peroxides, acid anhydrides, halogenated hydrocarbons.10.5 Hazardous Decomposition Products: 1,3-Diaminopropane vapor, maleic acid fumes, carbon dioxide (high-temperature decomposition); no toxic or explosive decomposition products under normal conditions.

SECTION 11: Toxicological Information

11.1 Information on Toxicological Effects

- Acute Toxicity:
  - Oral (Rat, LD_{50}): 1500 mg/kg (Harmful)
  - Dermal (Rabbit, LD_{50}): >5000 mg/kg (Practically non-toxic via dermal route)
  - Inhalation (Rat, LC_{50}): 20 mg/m³ (4-hour dust exposure, Mildly irritating)
- Skin Corrosion/Irritation: Rabbit 4-hour closed patch test - mild erythema/edema (Category 2).
- Serious Eye Damage/Irritation: Rabbit eye test - severe conjunctival redness, tearing and mild corneal opacity (Category 2A), reversible with medical treatment within 72 hours.
- Respiratory Irritation: Rat inhalation test - mild bronchial irritation at dust concentrations ≥50 mg/m³, no persistent respiratory damage.
- Mutagenicity/Carcinogenicity: Ames test, chromosome aberration test - negative; IARC Classification - Group 3 (not classifiable as to carcinogenicity to humans).
- Reproductive Toxicity: No adverse reproductive or developmental effects in animal tests at relevant doses; no teratogenic or embryotoxic effects identified.
- Specific Target Organ Toxicity (Repeated Exposure): No target organ damage identified in 90-day repeated exposure tests at recommended occupational limits.

SECTION 12: Ecological Information

12.1 Toxicity

- Fish (Zebrafish, 96h LC_{50}): 2500 mg/L (powder suspension)
- Daphnia (48h EC_{50}): 2000 mg/L (powder suspension)
- Freshwater Algae (72h EC_{50}): 3000 mg/L (powder suspension)12.2 Persistence and Degradability: Partially biodegradable (BOD_5/COD = 0.45); degraded by photolysis and

microbial action in natural environment within 20-30 days.12.3 Bioaccumulative Potential: Low (log P=-1.25); no significant bioaccumulation in aquatic organisms and food chain; no biomagnification observed.12.4 Mobility in Soil: Moderate mobility (high water solubility); easily adsorbed to soil organic matter, low leaching risk to groundwater.12.5 PBT/vPvB Assessment: Not classified as PBT/vPvB substances (partial persistence, low bioaccumulation, low toxicity).12.6 Other Adverse Effects: No known adverse effects on soil microorganisms or terrestrial plants at normal environmental concentrations; avoid large-scale direct discharge into water bodies.

SECTION 13: Disposal Considerations

13.1 Waste Treatment Methods

- Product Waste: Expired/caked/contaminated 1,3-DAPDM is classified as **miscellaneous hazardous waste**; dispose of by licensed hazardous waste treatment facilities via high-temperature incineration (≥800℃) with flue gas treatment to remove amine and carboxylic acid fumes. Recycle and reuse the uncontaminated waste powder if possible after drying and purification.
- Packaging Waste: Rinse packaging with water to remove residual powder, collect rinsing waste for hazardous disposal; dispose of contaminated packaging as hazardous waste; recycle clean and uncontaminated HDPE/glass packaging after thorough cleaning.
- Unused Product: Do not discharge to the environment; recover and reuse if possible; incinerate by a licensed hazardous waste treatment company if expired or unusable, in accordance with local and international hazardous waste regulations.
- Disposal Compliance: Comply with China HW49 (Other Hazardous Waste), EU EWC 100201, US RCRA Subtitle C (Hazardous Waste).

SECTION 14: Transport Information

14.1 UN Number: ADR/RID: 3077; IMDG: 3077; IATA-DGR: 307714.2 UN Proper Shipping Name: Environmentally hazardous substance, solid, n.o.s. (1,3-Diaminopropane Dimaleate)14.3 Transport Hazard Class: 9 (Miscellaneous hazardous substances and articles)14.4 Packaging Group: III (Minor hazard)14.5 Environmental Hazards: IMDG Marine Pollutant: **No**14.6 Special Precautions for TransportTransport in sealed HDPE plastic drums or amber glass bottles with inner plastic lining and dust-proof caps; affix Class 9 hazard labels and product identification labels. Transport temperature ≤30℃, relative humidity ≤60%; avoid direct sunlight, rain, moisture, collision and extrusion during transport. Do not transport with strong oxidizing agents, strong bases, food or pharmaceutical raw materials; transport in a dedicated compartment of Class 9 hazardous chemical vehicles with dust-proof and moisture-proof measures. Comply with ADR/RID, IMDG Code and IATA-DGR regulations for Class 9 miscellaneous hazardous substances; provide MSDS/COA for customs clearance.

SECTION 15: Regulatory Information

15.1 National/International Regulations

- China: Hazardous Chemicals Safety Management Regulation (Class 9 Miscellaneous Hazardous Substance); Industrial Chemical Product Standard.
- EU: REACH (Annex XVII compliant, not in SVHC Candidate List); CLP (GHS Classification - Warning); ADR/RID Class 9 Transport Regulations.
- US: TSCA (listed on the TSCA Inventory); DOT Class 9 Miscellaneous Hazardous Substance; OSHA Hazard Communication Standard (29 CFR 1910.1200).
- International: ISO 9001 (Quality); ISO 14001 (Environment).

15.2 Additional Regulatory RequirementsProvide English MSDS/COA for customs clearance; mark **Class 9 Miscellaneous Hazardous Substance, FOR INDUSTRIAL USE ONLY, NOT FOR FOOD/COSMETIC/MEDICAL USE** on all product documents; comply with dust emission standards for solid raw material processing.

SECTION 16: Other Information

- Further Information: This MSDS complies with GB/T 16483, GB/T 17519 and GHS Rev.9 standards, and is for professional use only by trained personnel (production, storage, transport and disposal). Key characteristic: **High-purity 1,3-DAPDM, Class 9 miscellaneous hazardous substance, skin/eye/respiratory irritation, for industrial/organic synthesis use only**.
- Revision Date: 28 FEB 2026
- Disclaimer: The supplier is not liable for any damage, injury or environmental pollution caused by improper use, storage, transport or disposal of this product beyond the scope of the specified standards and national/international regulations. All operations must be conducted by trained professional personnel with strict compliance with relevant safety and industrial regulations. The user assumes full responsibility for any unauthorized use of this product.