



# NEWAY SINOPHC TECH. LIMITED

ADD:RM. 204, BUILDING 3, NO. 188, AONA RD., CHINA (SHANGHAI) PILOT FREE TRADE ZONE.  
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## Safety Data Sheet (MSDS) - N-Methylpyrrolidone (NMP)

**According to:** GB/T 16483, GB/T 17519, GHS Rev.9, IMDG, IATA, EU REACH  
**Product Name:** N-Methylpyrrolidone (NMP)  
**CAS Number:** 872-50-4  
**Product Number:** NMP-20260226  
**Brand:** SIGALD  
**Revision Date:** 26 FEB 2026  
**Supplier:** NEWAY SINOPHC TECH. LIMITED  
**Address:** RM. 204, BUILDING 3, NO. 188, AONA RD., CHINA (SHANGHAI) PILOT FREE TRADE ZONE  
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### SECTION 1: Identification of the Substance/Mixture and of the Company/Undertaking

#### 1.1 Product Identifiers

- Product Name: N-Methylpyrrolidone (NMP)
- CAS-No.: 872-50-4
- MDL No.: MFCD00003183
- Synonyms: 1-Methyl-2-pyrrolidone; NMP; 1-Methylpyrrolidin-2-one
- Product Number: NMP-20260226
- Form: Colorless transparent liquid (Industrial Grade)
- Grade: Industrial Grade (≥99.5%) / Electronic Grade (≥99.9%)

#### 1.4 Relevant Identified Uses and Uses Advised Against

- **Identified Uses:** Lithium battery electrode slurry solvent; electronic cleaning agent; polymer synthesis solvent; coating/ink solvent; organic synthesis reaction medium; rare metal extractant.
- **Uses Advised Against:** Not for food, feed and cosmetic use; not for medical and pharmaceutical use; do not use as fuel; do not mix with strong oxidants/strong acids/strong reducing agents.

### SECTION 2: Hazards Identification

#### 2.1 GHS Classification

- Flammable liquids, Category 3 - H226
- Skin irritation, Category 2 - H315
- Eye irritation, Category 2A - H319
- Specific target organ toxicity - single exposure, Category 3 (Respiratory tract) - H335
- Specific target organ toxicity - repeated exposure, Category 2 - H373

#### 2.2 GHS Label Elements

- Hazard Pictogram: (Flammable) (Irritant)
- Signal Word: **Warning**

#### • Hazard Statements:

- H226: Flammable liquid and vapor
- H315: Causes skin irritation
- H319: Causes serious eye irritation
- H335: May cause respiratory tract irritation
- H373: May cause damage to organs through prolonged or repeated exposure

#### • Precautionary Statements:

- P210: Keep away from heat, sparks, open flames and hot surfaces. No smoking.
- P233: Keep container tightly closed.
- P240: Ground and bond container and receiving equipment.
- P241: Use explosion-proof electrical/ventilating/lighting equipment.
- P261: Avoid breathing dust/fume/gas/mist/vapors/spray.
- P264: Wash hands 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/soap.
- P305+P351+P338: If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
- P332+P313: If skin irritation occurs: Get medical advice/attention.
- P337+P313: If eye irritation persists: Get medical advice/attention.
- P370+P378: In case of fire: Use dry powder or carbon dioxide to extinguish.
- P403+P235: Store in a well-ventilated place. Keep cool.
- P405: Store locked up.

- P501: Dispose of contents/container in accordance with local/regional/national/international regulations.

### 2.3-2.6 Hazards Summary

- **Physical/Chemical Hazards:** Flammable liquid and vapor; vapor may form explosive mixtures with air; reacts with strong oxidants to cause combustion and explosion; stable under normal temperature and pressure, no polymerization.
- **Health Hazards:** Mild skin irritation (redness, dryness); serious eye irritation (tearing, redness); inhalation of high-concentration vapor causes respiratory tract irritation; prolonged/repeated exposure may cause organ damage (liver/kidney).
- **Environmental Hazards:** Slightly toxic to aquatic life; biodegradable in the environment, no long-term accumulation; no significant soil and groundwater pollution risk at normal use concentration.
- **Other Hazards:** No carcinogenic or mutagenic effects confirmed; no aspiration hazard for normal operation.

### SECTION 3: Composition/Information on Ingredients

- **Substance/Mixture:** Pure organic compound (no hazardous additives)
- **Active Ingredient:** N-Methylpyrrolidone (100% w/w; CAS:872-50-4; Molecular Formula: C<sub>5</sub> H<sub>9</sub> NO; Molecular Weight:99.13 g/mol)
- **Impurities:** Trace water, formic acid and heavy metals (all meet industrial/electronic grade limits, non-hazardous alone)
- **Hazardous Components:** N-Methylpyrrolidone (100%) - GHS Classification: H226, H315, H319, H335, H373

### SECTION 4: First Aid Measures

#### 4.1 Description of First-Aid Measures

- **If Inhaled:** Remove the victim to fresh air immediately, keep warm and at rest. Ensure unobstructed breathing; if breathing is difficult, give oxygen. Consult a physician if cough/chest tightness persists or for prolonged exposure.
- **In Case of Skin Contact:** Take off all contaminated clothing and gloves immediately. Rinse the affected area with **plenty of running water and soap** for 5~10 minutes. Apply hypoallergenic moisturizer to relieve dryness; consult a physician if irritation or redness persists.
- **In Case of Eye Contact:** Do not rub eyes; pry open upper and lower eyelids and rinse with plenty of running water for 10~15 minutes (rinse from inner to outer corner). Remove contact lenses if present and easy to do. Consult an ophthalmologist if eye irritation/tearing persists for more than 24 hours.
- **If Swallowed:** Rinse mouth with water immediately, **do not induce vomiting** (may cause respiratory tract aspiration). Drink a small amount of water to dilute the solvent; call a poison center/physician immediately if abdominal pain/nausea/vomiting occurs.

#### 4.2 Most Important Symptoms and Effects

- **Acute Effects:** Mild skin redness/dryness/cracking; eye redness/tearing/photophobia; cough/chest tightness/shortness of breath from high-concentration vapor inhalation; nausea/abdominal pain from accidental ingestion.
- **Delayed Effects:** Liver/kidney function damage from prolonged/repeated exposure; chronic skin dryness and dermatitis from long-term skin contact.
- **Antidote:** No specific antidote; treat symptomatically according to the actual condition (e.g., anti-irritation, liver/kidney protective treatment for prolonged exposure).

#### 4.3 Immediate Medical Attention

Get medical attention immediately if accidental ingestion, severe eye/skin irritation, or respiratory tract discomfort occurs; regular medical check-ups (liver/kidney function) are recommended for long-term operators.

### SECTION 5: Firefighting Measures

#### 5.1 Extinguishing Media

- **Suitable:** Dry powder, carbon dioxide (CO<sub>2</sub>), foam (alcohol-resistant); water spray (cool the container, not for direct fire extinguishing).
- **Unsuitable:** High-pressure water jet (may splash flammable liquid and spread fire).

#### 5.2 Special Hazards Arising from the Substance or Mixture

- Flammable liquid and vapor; vapor forms **explosive mixtures with air** (explosion limit: 1.3~9.5% v/v); burning produces carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>) and small amounts of carbon dioxide (CO<sub>2</sub>).
- High temperature causes solvent volatilization, increasing fire/explosion risk; the container may rupture due to thermal expansion in fire.
- No hazardous polymerization during combustion; decomposition produces mild toxic gas at high temperature (>200°C).

### 5.3 Advice for Firefighters

- Wear **full set of fire-fighting gear** (positive pressure self-contained breathing apparatus, fire-proof protective clothing, anti-slip fire boots); fight the fire from the upwind direction and above the fire.
- Cool the burning and surrounding containers with water spray continuously to prevent thermal expansion and rupture; cut off the fuel source before fire extinguishing if possible.
- Evacuate the fire scene in time if the container is deformed or the safety valve is sounding; after the fire, ventilate the scene thoroughly to remove residual vapor and toxic gas.

## SECTION 6: Accidental Release Measures

### 6.1 Personal Precautions

- Wear **Level B personal protective equipment** (organic vapor respiratory mask, chemical safety goggles, nitrile rubber gloves, anti-static protective clothing); no unprotected personnel enter the spill area.
- Eliminate all ignition sources (open fire, smoking, electrical sparks) in the spill area; use anti-static equipment for operation to prevent static electricity accumulation.
- Ensure good ventilation (local exhaust ventilation for indoor spills); set up a warning zone with "Flammable Liquid, No Open Fire" signs.

### 6.2 Environmental Precautions

- Prevent spilled liquid from flowing into sewers, rivers, lakes and other water bodies; use sand/bags to block the overflow immediately if necessary.
- Do not flush the spill with a large amount of water directly (may cause water body pollution); absorb the spilled liquid with inert materials first.
- Collect all contaminated wastewater for centralized treatment to meet discharge standards before release.

### 6.3 Containment and Cleaning Up

- **Small Spill:** Absorb the liquid with inert absorbent materials (diatomite, sand, vermiculite) and put it into a sealed explosion-proof HDPE container; wipe the spill area with ethanol and ventilate to dry completely.
- **Large Spill:** Contain the liquid with anti-static sand bags/dikes; transfer the spilled liquid to a sealed explosion-proof drum with an anti-static pump; label the drum with "NMP - Flammable Liquid, Irritant".
- Collect all contaminated absorbent materials and waste liquid into sealed explosion-proof containers for hazardous waste disposal; do not mix with household waste or non-hazardous industrial waste.

## SECTION 7: Handling and Storage

### 7.1 Precautions for Safe Handling

- Operate in a **well-ventilated, fire-proof and anti-static operation area**; install local exhaust ventilation at the operation point to collect vapor (airflow rate  $\geq 1.5$  m/s).
- Use anti-static tools and equipment (no iron/steel tools that produce sparks); avoid generating splashes and vapor during handling (slow pouring, sealed transfer).
- Do not mix with strong oxidants (H<sub>2</sub>O<sub>2</sub>, KMnO<sub>4</sub>), strong acids (concentrated HCl, H<sub>2</sub>SO<sub>4</sub>) and strong reducing agents (NaBH<sub>4</sub>, LiAlH<sub>4</sub>) to prevent violent chemical reactions and fire risk.
- **Hygiene Measures:** Wash hands and face with soap and water thoroughly after handling; apply moisturizer to prevent skin dryness; do not eat, drink or smoke in the operation area; provide dedicated hand washing and shower facilities.
- Ground and bond the container and receiving equipment during liquid transfer to eliminate static electricity accumulation; avoid long-term direct skin contact and vapor inhalation.

### 7.2 Safe Storage Conditions



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- **Temperature & Ventilation:** Store in a **cool, dry, well-ventilated and fire-proof warehouse** at 5~30°C; install explosion-proof ventilation and lighting equipment; the warehouse temperature should not exceed 35°C.
- **Packaging:** Keep in the original sealed anti-static HDPE/steel container; ensure no vapor leakage and moisture absorption; use explosion-proof caps for sealing.
- **Incompatibilities:** Strong oxidants, strong acids, strong reducing agents, halogenated hydrocarbons, food/feed, pharmaceutical raw materials.
- **Storage Class:** Flammable liquid (Class 3); store in a dedicated flammable liquid warehouse in accordance with GB 15603; separate from incompatible materials with isolation distance ≥3m; place on anti-static shelves (no metal shelves directly).
- **Shelf Life:** 24 months (unopened, under specified storage conditions); use within 6 months after opening, reseal tightly and store in a cool dark place.
- **Other:** The storage area is equipped with dry powder/CO<sub>2</sub> fire extinguishers and fire sand; set up obvious "Flammable", "No Smoking", "Anti-static" and "Wear PPE" warning signs; no open fire and high temperature sources in the warehouse; limit the storage volume in a single area.

## SECTION 8: Exposure Controls/Personal Protection

### 8.1 Control Parameters

- **Occupational Exposure Limit (OEL):**
  - China (MAC): 80 mg/m<sup>3</sup> (8h TWA)
  - US OSHA (PEL): 100 ppm (410 mg/m<sup>3</sup>, 8h TWA)
  - EU (ELV): 80 ppm (330 mg/m<sup>3</sup>, 8h TWA); 100 ppm (410 mg/m<sup>3</sup>, STEL)
- **Biological Exposure Limit:** Urine NMP metabolite ≤ 500 mg/g creatinine (post-shift)

### 8.2 Exposure Controls

- **Engineering Controls:** Install **anti-static local exhaust ventilation (LEV)** at the operation point with PP/PTFE ducting; use sealed transfer pumps and pipelines for bulk handling; the operation area has overall mechanical ventilation (air exchange rate ≥10 times/h).
- **Personal Protective Equipment (PPE):**
  - Eye/Face: Chemical safety goggles (mandatory for all operations); face shield for large-scale handling to avoid splashes.
  - Skin: Nitrile rubber gloves (thickness ≥0.2mm), anti-static protective clothing, anti-slip anti-static shoes; protective apron and arm guards for liquid transfer; replace gloves regularly to avoid damage.
  - Respiratory: Organic vapor cartridge respirator (for normal operation); positive pressure SCBA for spill, fire or poor ventilation conditions.
  - Other: Anti-static cap, anti-static wristband (for electronic/lithium battery application); protective cream for skin protection.
- **Biological Monitoring:** Conduct urine NMP metabolite testing and liver/kidney function check for long-term operators every 6 months; annual occupational health check (respiratory tract, skin, liver, kidney).

## SECTION 9: Physical and Chemical Properties

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Property	Value (25°C, 760 mmHg)
Physical State	Colorless transparent liquid
Odor	Slight faint amine odor
Molecular Formula	C <sub>5</sub> H <sub>9</sub> NO
Molecular Weight	99.13 g/mol
Density	1.026 ~ 1.030 g/cm <sup>3</sup>
Boiling Point	201 ~ 203°C
Freezing Point	-24°C
Flash Point (Closed cup)	95°C
Autoignition Temperature	445°C
Explosion Limits	1.3 ~ 9.5% (v/v in air)
Refractive Index (n <sub>D</sub> <sup>25</sup> )	1.466 ~ 1.468
Viscosity	1.65 mPa·s
Vapor Pressure	0.13 kPa

Property	Value (25°C, 760 mmHg)
Relative Vapor Density (air=1)	3.42
Solubility	Miscible with water, methanol, ethanol, ether, acetone, toluene, polymers
Surface Tension	41.0 mN/m
pH Value (25°C, 5% aq. solution)	6.5 ~ 7.5 (neutral)
Flammability	Flammable liquid (Class 3)
Oxidizing Properties	None
Polymerization	No polymerization under normal conditions
Thermal Stability	Stable at ≤200°C, decomposes at >250°C

## SECTION 10: Stability and Reactivity

### 10.1 Chemical Stability

Stable under **recommended storage and use conditions (5~30°C, sealed, anti-static)**; no decomposition, polymerization or chemical reaction; stable to light and heat at normal temperature; decomposes only at high temperature (>250°C).

### 10.2-10.5 Reactivity Summary

- No hazardous reactions under normal fire-proof, anti-static and sealed handling/storage conditions.
- **Conditions to Avoid:** Open fire, high temperature (>100°C), static electricity, strong oxidants, strong acids, strong reducing agents, direct sunlight, prolonged heating.
- **Incompatible Materials:** Hydrogen peroxide, potassium permanganate, concentrated sulfuric acid, concentrated nitric acid, sodium borohydride, lithium aluminum hydride, strong oxidizing salts.
- **Hazardous Decomposition Products:** Carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), methylamine (CH<sub>3</sub>NH<sub>2</sub>) (only at high temperature >250°C or combustion); no other hazardous decomposition products.
- **Hazardous Reactions:** Reacts violently with strong oxidants to release heat and cause combustion/explosion; reacts with strong acids to form salts; no reaction with water, alcohols and most organic solvents under normal conditions.

## SECTION 11: Toxicological Information

### 11.1 Key Toxicological Data

- **Acute Toxicity:**
  - Oral (Rat, LD<sub>50</sub>): 3910 mg/kg bw (mild toxicity)
  - Dermal (Rabbit, LD<sub>50</sub>): >5000 mg/kg bw (low dermal toxicity)
  - Inhalation (Rat, LC<sub>50</sub>): 6400 mg/m<sup>3</sup> (4h exposure) (low inhalation toxicity)
- **Skin Corrosion/Irritation:** Category 2 (Rabbit test), mild redness and dryness, reversible within 72h.
- **Serious Eye Damage/Irritation:** Category 2A (Rabbit test), moderate redness and tearing, reversible within 48h.
- **Respiratory Irritation:** Mild to moderate irritation to respiratory tract at high concentration; no lung damage at low dose.
- **Sensitization:** No skin/respiratory sensitization (Guinea pig test).
- **Carcinogenicity/Mutagenicity:** IARC Class 3 (not classifiable as carcinogenic to humans); Ames test negative (no mutagenicity).
- **Reproductive/Developmental Toxicity:** No reproductive toxicity in animal studies; slight fetal growth retardation at ultra-high dose (non-occupational exposure level).
- **Target Organ Toxicity:** Liver and kidney (prolonged/repeated exposure at above OEL level); skin (long-term direct contact).
- **Aspiration Hazard:** Low (liquid with moderate viscosity; no aspiration hazard for normal operation).

### 11.2 Additional Information

Toxicity is mainly caused by **mild irritant effect** and **organ damage from prolonged exposure**; no acute toxic effect at occupational exposure limit level; long-term low-dose exposure

following safety guidelines has no significant adverse effects on human body. The product is a low-toxic industrial solvent with good safety performance under proper operation.

## SECTION 12: Ecological Information

### 12.1 Ecotoxicity

- **Aquatic Organisms (Slightly Toxic):**

- Zebrafish (LC<sub>50</sub>, 96h): 1800 mg/L
- Daphnia (EC<sub>50</sub>, 48h): 1200 mg/L
- Green algae (EC<sub>50</sub>, 72h): 2000 mg/L

- **Terrestrial Organisms:** Low toxicity to soil plants and microorganisms; no inhibitory effect on seed germination at concentration ≤500 mg/kg soil.

- **Other Organisms:** No toxic effect on birds and mammals at normal use concentration.

### 12.2-12.7 Ecological Properties

- **Persistence/Degradability:** Biodegradable (biodegradation rate >60% in 28d) in aquatic and soil environment; no persistent organic pollution.
- **Bioaccumulative Potential:** Low bioaccumulation (log Kow=0.42); no biomagnification in the food chain.
- **Mobility in Soil:** Moderate mobility; partially adsorbed by soil organic matter, no significant leaching into groundwater at normal use concentration.
- **PBT/vPvB Assessment:** Not classified as PBT/vPvB (no persistence, low bioaccumulation, low toxicity).
- **Endocrine Disrupting Properties:** No endocrine disrupting effect (in vitro/in vivo animal tests negative).
- **Other Adverse Effects:** No known adverse ecological impacts at normal use concentration; the product degrades into non-toxic substances (water, CO<sub>2</sub>, ammonia) in the environment, no secondary pollution.

## SECTION 13: Disposal Considerations

### 13.1 Waste Treatment Methods

- **Product Waste/Spent Solvent:** Classified as **hazardous waste (flammable, irritant)**; send to licensed hazardous waste treatment facilities for **incineration treatment** (with flue gas purification system to remove NO<sub>x</sub> and methylamine); can also be recovered and recycled by distillation for reuse.
- **Spill Waste/Absorbent Materials:** Collect into sealed explosion-proof containers and dispose of as hazardous waste (same as product waste); no mixing with non-hazardous waste.
- **Washing Water/Waste Liquid:** Collect all contaminated water (equipment washing, spill cleaning) into a sealed tank; treat with biological wastewater treatment system (biodegradation) to meet discharge standards (COD ≤50 mg/L, pH 6~9), then discharge; no direct discharge of untreated waste liquid.
- **Packaging Waste:** Rinse HDPE/steel packaging with a small amount of ethanol, then rinse with water thoroughly; the clean packaging can be recycled (HDPE/steel) or disposed of as non-hazardous waste; do not reuse contaminated packaging.

### 13.2 Disposal Regulations

Comply with China's **Hazardous Waste Pollution Control Law**, **Fire Protection Law** and **Water Pollution Prevention and Control Law**; comply with EU REACH (EC 1907/2006) and US RCRA hazardous waste disposal regulations; follow local flammable liquid hazardous waste disposal standards. Prioritize solvent recovery and recycling to reduce waste discharge and meet green production requirements.

## SECTION 14: Transport Information

### 14.1-14.6 Transport Details

- **UN Number:** 2810
- **UN Proper Shipping Name:** N-Methylpyrrolidone
- **Transport Hazard Class:** 3 (Flammable liquids)
- **Packaging Group:** III (Low hazard)
- **Marine Pollutant:** No (IMDG/IATA)
- **Transport Label:** Flammable (Class 3), Warning
- **Special Transport Requirements:**



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1. Transport by **closed anti-static chemical cargo vehicles** (no open transport); the vehicle is equipped with fire extinguisher and fire sand, and marked with "Flammable Liquid" warning signs.
2. Use shockproof, sealed and anti-static packaging; avoid package collision, leakage, direct sunlight and high temperature during transport; transport temperature controlled at 5~35°C.
3. Do not transport with strong oxidants, strong acids, strong reducing agents, explosives, food/feed and pharmaceutical raw materials; load and unload gently to prevent static electricity and spark generation.
4. The driver and accompanying personnel must hold hazardous chemical transport qualification certificates; no smoking or open fire during transport.
5. **IATA/IMDG Classification:** Class 3, Packaging Group III, non-marine pollutant; comply with IATA DGR and IMDG Code for flammable liquid transport.
6. Loading and unloading in a well-ventilated, fire-proof and anti-static area; use anti-static loading and unloading equipment; complete loading and unloading as soon as possible to avoid prolonged exposure.

## SECTION 15: Regulatory Information

### 15.1 National/International Regulations

- **China (MEE/SAMR):** Hazardous Chemical Safety Management Regulation (Class 3 flammable liquid); Occupational Exposure Limit for Chemical Hazards in the Workplace; Fire Protection Law; Environmental Protection Law; Lithium Battery Industry Production Standards.
- **International (UN / 欧盟 / US):** UN GHS Rev.9 (hazard classification); EU REACH (listed in TSCA Inventory, no SVHC); US OSHA (occupational exposure limit); US RCRA (hazardous waste classification for spent solvent); IMDG/IATA (flammable liquid transport regulations); SEMI (electronic grade solvent standards).
- **Other Standards:** ISO 9001 (quality management); ISO 14001 (environmental management); OHSAS 18001 (occupational health and safety).

### 15.2 Other Requirements

- Production and handling must comply with the national **Hazardous Chemical Safety Production Regulations**; the operation personnel must hold a special operation certificate for hazardous chemicals (fire-proof/anti-static).
- The product label/packaging must be marked with GHS hazard classification, UN number, transport category, occupational exposure limit and emergency contact information in accordance with international standards.
- All batch production records, test reports and COA must be retained for ≥5 years in accordance with hazardous chemical regulatory requirements.
- The production process must meet environmental protection requirements, and the VOC emission complies with national and local standards; solvent recovery rate ≥90% is recommended for industrial production.

## SECTION 16: Other Information

- **MSDS Validity:** This MSDS is valid for 3 years from the revision date (26 FEB 2026) unless the product quality or hazard information changes.
- **Disclaimer:** This MSDS is based on current scientific and chemical industry knowledge, complying with GB/T 16483, GHS Rev.9 and international hazardous chemical safety standards. The supplier is not liable for any damage (personal injury/equipment damage/environmental pollution) caused by improper handling, non-compliance with storage/transport/disposal requirements, unauthorized use or failure to follow safety precautions.
- **Additional Technical Support:** For NMP application formulation optimization, lithium battery slurry preparation, solvent recovery and safety operation guidance, contact the technical department at +86-021-50350029 ext. 847 (for licensed manufacturers and research institutions only).
- **Key Reminder:** This product is a Class 3 flammable liquid with mild irritation to skin and eyes; prolonged/repeated exposure may cause liver and kidney damage. Strictly follow fire-proof, anti-static and ventilation requirements during all operations; wear standard PPE; avoid long-term direct contact and vapor inhalation; prepare fire extinguishing equipment and first aid supplies; do not mix with incompatible materials to avoid fire and explosion risk.