

Technical Data Sheet (TDS) - N-Methylpyrrolidone (NMP)

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Product Name

N-Methylpyrrolidone (NMP) N - 甲基吡咯烷酮 **CAS Number:** 872-50-4 **MDL Number:** MFCD00003183 **Formula:** C₅ H₉ NO **Molecular Weight:** 99.13 g/mol **Form:** Colorless transparent liquid (Industrial Grade) **Odor:** Slight faint amine odor

1. Product Overview

NMP is a high-purity **polar aprotic organic solvent** with excellent chemical stability and solvency power. It features a high boiling point, low volatility, good thermal stability and miscibility with most organic solvents and water. As a versatile industrial solvent, it has ultra-low impurity content, low water and acid values, and stable physical and chemical properties between batches. It can dissolve a variety of polymers, resins, rubber and organic compounds, and is widely used as a solvent, dispersant and reaction medium in electronic manufacturing, polymer synthesis, coating ink, lithium battery manufacturing and fine chemical industries. It is a key raw material for modern industrial production with high application value.

2. Technical Specifications (Complies with Industrial Grade Standard)

表格

Item	Specification
Appearance	Colorless transparent liquid, no turbidity/precipitate/floating matter
Assay (NMP, GC)	≥ 99.5%
Water Content (Karl Fischer)	≤ 0.05%
Acidity (as HCOOH)	≤ 0.005%
Color (APHA, Pt-Co)	≤ 10
Density (25°C)	1.026 ~ 1.030 g/cm ³
Refractive Index (n _{25°})	1.466 ~ 1.468
Boiling Point (760mmHg)	201 ~ 203°C
Flash Point (Closed cup)	95°C
Freezing Point	-24°C
Heavy Metals (Pb, AAS)	≤ 1 ppm
Total Metal Ion Impurities	≤ 5 ppm
Evaporation Residue	≤ 0.001%
Solubility	Miscible with water, alcohols, ethers, esters, ketones, hydrocarbons, polymers
Viscosity (25°C)	1.65 mPa·s
Thermal Stability	Stable at ≤ 200°C (no decomposition)

3. Product Advantages

- High Purity & Stable Quality:** NMP content ≥99.85%, ultra-low water, acid and heavy metal impurities, batch-to-batch performance deviation ≤ ±0.2%.
- Excellent Solvency Power:** Dissolves most polymers (PU, PVC, PES), resins, rubber and organic compounds, suitable for high-solid-content formulation.
- Favorable Physical Properties:** High boiling point, low volatility, low viscosity, good thermal stability, no easy volatilization and loss during processing.
- Good Compatibility:** Miscible with water and all common organic solvents in any proportion, flexible formula adjustment, wide application range.
- Chemical Inertness:** Stable chemical properties, no reaction with most substances under normal temperature and pressure, suitable as reaction medium.
- Recyclable:** Easy to recover and purify by distillation, low use cost, in line with green production concept.

4. Application Fields



NEWAY SINOPHC TECH. LIMITED

ADD:RM. 204, BUILDING 3, NO. 188, AONA RD., CHINA (SHANGHAI) PILOT FREE TRADE ZONE.
Email:marketing01@newayphc.com; Phone:+86-021-50350029 <https://www.newayphc.com>

- **Lithium Battery Manufacturing:** Solvent for lithium battery electrode slurry (positive/negative electrode), improves slurry uniformity and coating performance.
- **Electronic Manufacturing:** Precision cleaning agent for electronic components, semiconductor wafer and PCB board; solvent for photoresist and electronic adhesive.
- **Polymer Industry:** Solvent for polymer synthesis (polyimide, polyamide, polyurethane); plasticizer and dispersant for rubber and plastic processing.
- **Coating & Ink:** Main solvent for high-performance industrial coatings, UV-curable coatings and gravure ink; improves film leveling and adhesion.
- **Fine Chemicals:** Reaction medium for organic synthesis and pharmaceutical intermediate preparation; extractant for rare metal separation and purification.
- **Other Fields:** Solvent for textile dyeing and finishing; dispersant for pigment and filler; cleaning agent for industrial equipment.

5. Usage Methods

Application Dosage & Formulation (Adjust according to process requirements)

- **Lithium Battery Slurry:** 30~50% of the total formulation, mixed with active material, conductive agent and binder, high-speed dispersion for 2~4h.
- **Coating/Ink:** 20~40% of the total formulation, used as main solvent, compound with other solvents to control drying rate.
- **Electronic Cleaning:** Use as pure solvent or dilute with deionized water (1:1~1:3); ultrasonic cleaning for 5~10 min at 30~40°C.
- **Organic Synthesis:** 40~70% of the reaction system, used as reaction medium, suitable for normal temperature/heating reaction ($\leq 180^{\circ}\text{C}$).

Key Operating Requirements

- Operate in a well-ventilated area, avoid open fire and high temperature ($\geq 100^{\circ}\text{C}$) to prevent fire risk.
- Do not mix with strong oxidants, strong acids and strong reducing agents directly to avoid chemical reactions.
- For coating/ink film forming, control the drying temperature at 80~120°C, step-by-step heating to avoid film defects.

6. Packaging & Storage

Packaging Specifications (Sealed, Anti-static)

- 1 L HDPE plastic bottle (sealed, laboratory/R&D small-batch use)
- 5 L HDPE anti-static plastic drum (industrial grade, small-scale production)
- 25 L HDPE anti-static plastic drum (industrial grade, mass production)
- 200 L steel drum (inner coated with anti-corrosion layer, bulk industrial use)
- 1000 kg IBC tote (HDPE inner tank, anti-static, large-scale project use)
- Custom packaging (10/50 L) available for customer process requirements.

Storage Conditions

- **Core Requirement:** Store in a **cool, dry, well-ventilated and fire-proof warehouse** at 5~30°C; avoid direct sunlight, open fire and high temperature sources.
- Keep the container tightly sealed (anti-static cap) to prevent solvent volatilization and moisture absorption; store in original packaging only.
- Classified as flammable liquid, store separately from strong oxidants, strong acids, strong reducing agents and food/feed; isolation distance $\geq 3\text{m}$, set up fire separation.

7. Safety & Protection

- The product is a flammable liquid with mild irritation to skin and eyes; long-term contact may cause skin dryness; wear standard protective equipment during handling and operation.
- **Recommended PPE:** Anti-static rubber gloves, chemical safety goggles, anti-static protective clothing, anti-slip shoes; wear a respiratory mask (organic vapor type) in poorly ventilated areas.
- **Fire Prevention:** Prohibit open fire, smoking and electrical sparks in the operation area; equip with dry powder/ CO_2 fire extinguisher for fire emergency.
- **Accident Treatment:**