1. PRODUCT IDENTIFICATION

**Name**

*n*-Methyl Pyrrolidone

**Synonyms**

1-methyl-2-pyrrolidone; *n*-methyl-gamma-butyrrolactam; 1-methyl-2-pyrrolidinone; NMP & others

**CAS#**

872-50-4

**Europe EC#**

212-828-1

**Product Uses**

petroleum refining, desulphurization, coatings, and others

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**EMERGENCY INFORMATION**

<table>
<thead>
<tr>
<th>Country</th>
<th>Contact Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>Call CANUTEC collect</td>
</tr>
<tr>
<td>U.S.A.</td>
<td>Call CHEMTREC</td>
</tr>
</tbody>
</table>

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2. HAZARDS

**GHS Class**

Combustible

**GHS Precautionary Statements for Labelling**

- **P210** Keep away from heat, sparks, open flames and hot surfaces. No smoking.
- **P262** Do not get in eyes, on skin or on clothing.
- **P264** Wash thoroughly after handling.
- **P280** Wear eye protection, protective gloves and clothing of butyl or “Viton”.

**Canada – WHMIS Key**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 2</td>
<td>Flash Point &lt;38°C, B 3 – Flash Point &gt;38°C &amp; &lt;93°C</td>
</tr>
<tr>
<td>D 1</td>
<td>Immediately Toxic, D 2 – Chronic Toxicity</td>
</tr>
<tr>
<td>C</td>
<td>Oxidising Substance, E – Corrosive, F – Reactive Substance</td>
</tr>
</tbody>
</table>

(NMP is very near the upper limit for B 3)

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3. COMPOSITION

<table>
<thead>
<tr>
<th>Component</th>
<th>% TWAEV / TLY ppm / mg/m³</th>
<th>LD₅₀ (mg/kg) ORAL</th>
<th>LD₅₀ (mg/kg) SKIN</th>
<th>LC₅₀ ppm INHALATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Methyl-2-Pyrrolidone</td>
<td>100%</td>
<td>10 / 40 (skin)</td>
<td>3900</td>
<td>8000</td>
</tr>
</tbody>
</table>

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Please ensure that this SDS is given to, and explained to people using this product.
4. **FIRST AID**

**SKIN:** Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.

**EYES:** Wash eyes with plenty of water, holding eyelids open. Seek medical assistance if there is any irritation.

**INHALATION:** Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.

**INGESTION:** Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim’s head below hips to prevent inhalation of vomited material. Seek medical help promptly.

Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

5. **FIRE FIGHTING & FLAMMABILITY**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flash Point</td>
<td>&gt;90°C / &gt;194°F (closed cup); 91°C / 196°F (Pensky Martens closed cup)¹</td>
</tr>
<tr>
<td>Autoignition Temperature</td>
<td>&gt;245°C / &gt;473°F; 270°C / 518°F¹ – various values reported</td>
</tr>
<tr>
<td>Flammable Limits</td>
<td>1.3% ‡ 9.5%</td>
</tr>
<tr>
<td>Combustion Products</td>
<td>carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments</td>
</tr>
<tr>
<td>Firefighting Precautions</td>
<td>alcohol-resistant foam, dry chemical, water fog or spray, water jet may spread flames; firefighters must wear SCBA</td>
</tr>
<tr>
<td>Static Charge Accumulation</td>
<td>cannot accumulate a static charge on agitation or pumping</td>
</tr>
</tbody>
</table>

6. **ACCIDENTAL RELEASE MEASURES**

**Leak Precaution** dyke to control spillage and prevent environmental contamination

**Handling Spill** recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep, shovel & store in closed containers for recycling or disposal

7. **HANDLING & STORAGE**

Store in a cool, dry environment, away from sources of ignition, strong acids or strong alkalies and oxidising agents.

Similar products (*but n-methyl pyrrolidone is not known to*) may react with oxygen in the air to form explosive or flammable peroxides. Ensure that containers are full & tightly sealed. If prolonged storage of a part container is anticipated, flush headspace with dry nitrogen gas prior to sealing. Empty containers may contain a flammable or explosive vapour. Always ensure that containers, whether empty or full, are tightly sealed unless in use.

Avoid breathing product vapour. Never cut, drill, weld or grind on or near this container. Avoid contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

**Warning:** Exercise extra caution when handling potentially toxic substances dissolved in *n*-methyl pyrrolidone (NMP). Although NMP itself has low toxicity, it may facilitate & accelerate the transport of other substances across the skin and into the body.

8. **EXPOSURE CONTROL & PERSONAL PROTECTION**

<table>
<thead>
<tr>
<th>Standard</th>
<th>Value</th>
<th>Standard</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario TWAEV</td>
<td>100ppm / 400mg/m³</td>
<td>Ontario STEV</td>
<td>not listed</td>
</tr>
<tr>
<td>ACGIH TLV</td>
<td>not listed</td>
<td>ACGIH STEL</td>
<td>not listed</td>
</tr>
<tr>
<td>OSHA PEL</td>
<td>not listed</td>
<td>OSHA STEL</td>
<td>not listed</td>
</tr>
<tr>
<td>Ventilation</td>
<td>mechanical ventilation may be required to control airborne titre</td>
<td>Hands</td>
<td>butyl rubber gloves recommended ‡ other types may also protect; consult supplier to confirm suitability</td>
</tr>
<tr>
<td>Eyes</td>
<td>safety glasses with side shields † always protect the eyes</td>
<td>Clothing</td>
<td>no special protective clothing required</td>
</tr>
</tbody>
</table>

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*Member: Canadian Association of Chemical Distributors*
Product Name: n-Methyl Pyrrolidone

9. PHYSICAL PROPERTIES

Odour & Appearance clear, colourless, hygroscopic liquid with mild amine odour
Odour Threshold not known
Vapour Pressure 0.29mmHg / 0.039kPa (20°C / 68°F)
Evaporation Rate (Butyl Acetate = 1) 0.06
Vapour Density (air = 1) 3.4
Boiling Range 202°C / 396°F
Melting Point -24°C / -12°F
Specific Gravity 1.03 (20/20°C)
Water Solubility complete
Also soluble in most organic solvents, limited solubility in aliphatic hydrocarbons
Log P_{O/W} (Octanol/H_2O partition) -0.38
Viscosity 1.8 centipoise (20°C / 68°F)
pH 7.7-8.0 (10% solution)
Conversion Factor 1ppm = 4.05mg/m^3
Molecular Weight 99grams per mole

10. REACTIVITY

Dangerously Reactive With strong oxidising agents
Also Reactive With strong acids or alkalies cause vigorous hydrolysis to irritating 4-aminobutanoic acid
Stability stable; will not polymerize
Decomposes in Presence of highly acid or highly alkaline medium
Decomposition Products 4-aminobutanoic acid
Sensitive to Mechanical Impact no

11. TOXICITY

Effects, Acute Exposure
Skin Contact mildly irritating to skin
Skin Absorption readily; nevertheless, no toxic effects expected by this route;
Eye Contact liquid moderately irritating; vapour slightly irritating at 15ppm, severely so above 50ppm
Inhalation above 16ppm caused discomfort; above 49ppm described as unbearable
Ingestion not known, likely to be only slightly toxic not a route of industrial exposure
LD_{50} (oral) 3900mg/kg (rat), 3500mg/kg (rabbit), 4400mg/kg (guinea pig), 5300mg/kg (mouse)
LD_{50} (skin) 8000mg/kg (rabbit)
LC_{50} (inhalation) <5100ppm (rat) part vapour, part mist tested due to low vapour pressure

Effects, Chronic Exposure
General prolonged exposure may cause irritation, swelling, peeling skin, wrinkling & stinging; symptoms probably caused by the vigorous absorption of water by NMP
Sensitising not a sensitizer in humans or animals
Carcinogen/Tumorigen not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect no known effect in humans; reproductive issues in rats on oral administration see NOAEL below
Mutagen no known effect on humans or animals
Synergistic With not known
NOAEL (developmental) 160mg/kg/day (rat, oral)^1 not a route of industrial exposure
NOAEL (fertility) 350mg/kg/day (rat, oral)^1 not a route of industrial exposure
NOAEL (male fertility) 1000mg/kg/day (rat, oral)^1 not a route of industrial exposure

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12. ECOLOGICAL INFORMATION

Bioaccumulation: rapidly eliminated from living organisms (~24 hour); cannot bioaccumulate

Biodegradation: biodegrades readily & rapidly in the presence of oxygen: in soil ½-life 4-12 days; in water 73% in 28 days, 88% in 30 days, 90% in 5 days

Abiotic Degradation: reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 5 hours

Mobility in soil, water: water soluble; moves readily in soil & water

Aquatic Toxicity:
- LC₅₀ (Fish, 96hr): 832mg/litre (Lepomis macrochirus), 4000mg/litre Leuciscus idus), 1072mg/litre (Pimephales promelas), 1400 & 2673mg/litre (Poeckilia reticulata), 3048mg/litre (Salmo gairdneri)
- EC₅₀ (Crustacea, 48hr): 4897mg/litre (Daphnia magna), 4655mg/litre (Gammarus sp), 1107mg/litre (Palemonetes vulgaris)
- EC₅₀ (Algae): 6000mg/litre (Scenedesmus subspicatus)
- EC₅₀ (Bacteria): >600mg/litre (industrial activated sludge)¹
- TDK (Bacteria): 9000mg/litre (Pseudomonas putida)

13. DISPOSAL

Waste Disposal: do not flush to sewer, recycle if possible, incinerate in approved facility with flue gas monitoring & scrubbing

Containers:
- Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.
- Pails must be vented and thoroughly dried prior to crushing and recycling.
- IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years.

Never cut, drill, weld or grind on or near this container, even if empty

14. TRANSPORT CLASSIFICATION

<table>
<thead>
<tr>
<th>Country</th>
<th>PIN</th>
<th>UN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada TDG</td>
<td></td>
<td>- not regulated for transport</td>
</tr>
<tr>
<td>AND</td>
<td></td>
<td></td>
</tr>
<tr>
<td>U.S.A. 49 CFR</td>
<td>Class &amp; Packing Group</td>
<td>not regulated for transport</td>
</tr>
<tr>
<td>Marine Pollutant</td>
<td></td>
<td>not a marine pollutant</td>
</tr>
<tr>
<td>ERAP Required</td>
<td></td>
<td>NO</td>
</tr>
</tbody>
</table>

15. REGULATIONS

Canada DSL on inventory
U.S.A. TSCA on inventory
Europe EINECS on inventory

U.S.A. Regulations:
- Allowable Tolerances: Residues of n-methylpyrrolidone are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Use: solvent, cosolvent.
- TSCA Requirements: A testing consent order is in effect for N-methylpyrrolidone for health effects testing. FR citation: 11/23/93.
- FIFRA Requirements: Residues of n-methylpyrrolidone are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Use: solvent, cosolvent.

16. OTHER INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577
Data from RTECS, HSDB (Haz. Substance Data Base), Cheminfo (CCOHS), IUCLID Datasheets (ESIS – European Chem. Substance Info. System), & others.
Preparation Date: July 2005 Revision Date: July 2008, July 2011, July 2014

(1) European Chemicals Agency (EChA) dossier on 1-methyl-2-pyrrolidone:

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