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1. PRODUCT IDENTIFICATION

Name: *n-Methyl Pyrrolidone*

Synonyms: *1-methyl-2-pyrrolidone; n-methyl-gamma-butyrolactam; 1-methyl-2-pyrrolidinone; NMP & others*

CAS# 872-50-4

Product Uses: *petroleum refining, desulphurization, coatings, and others.*

Supplier *Megaloid Laboratories Limited*
Identifier: *5515 North Service Road, Suite 306
Burlington, Ontario, Canada
L7L 6G4
Phone: 905-337-7411 / Fax: 905-337-1686*

EMERGENCY INFORMATION Call CHEMTREC - (800) 424-9300 (CCN # 693764)

2. HAZARDS

GHS Class <i>(category)</i>	Flammable <i>(4)</i>	Eye irritant <i>(2A)</i>	Skin irritant <i>(3)</i>	STOT <i>(3)</i>	Reproduction <i>(1)</i>
Signal Word	DANGER				
Hazard Statements	<i>Combustible liquid (H227)</i>	<i>Causes serious eye irritation (H319)</i>	<i>Causes mild skin irritation (H316)</i>	<i>Cause respiratory tract irritation (H335)</i>	<i>Ingestion or inhalation may damage fertility or the unborn child (H360)</i>



Label Pictograms

GHS Precautionary Statements for Labelling

Prevention

- P202** Do not handle until all safety precautions have been read and understood.
- P210** Keep away from heat, sparks, open flames and hot surfaces. No smoking.
- P260** Do not breathe dust/gas/mist/vapours.

P264	Wash hands thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear eye protection, protective gloves and clothing of butyl rubber
Response	
P312	Call a POISON CENTER or doctor/physician if you feel unwell.
P303, P352	IF ON SKIN (or hair): Wash with plenty of soap and water.
P304, P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305, P351, P338	IF IN EYES: rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P308 + P311	IF exposed or concerned: Call a POISON CENTER or doctor/physician.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P337 + P311	If eye irritation persists: Call a POISON CENTER or doctor/physician.
P362 + P364	Take off contaminated clothing and wash it before reuse.
P370 + P378	In case of fire: Use water spray, dry powder, foam or carbon dioxide for extinction.
Storage	
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
Disposal	
P501	Dispose of contents and container in accordance with local, regional, national and international regulations.

3. COMPOSITION

Chemical Name:	CAS No.	%	Other Identifiers
<i>n</i> -Methyl Pyrrolidone	872-50-4	100	EC # 212-828-1

4. FIRST AID

Inhalation

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

Skin Contact

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

Eye Contact

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

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.

5. FIRE FIGHTING & FLAMMABILITY

Extinguishing Media

Suitable Extinguishing Media

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Foam, dry chemical, water fog, water spray only to cool & dilute, product floats on water - water jet spreads flames

Combustion Products

*Carbon monoxide, nitrogen oxides, smoke, part oxidized hydrocarbon fragments
Cannot accumulate a static charge on agitation or pumping.*

Special Protective Equipment and Precautions for Fire-fighters

Firefighters must wear SCBA. Fire-fighters may enter the area if positive pressure SCBA and full Bunker Gear is worn.

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures

Evacuate the area immediately. Isolate the hazard area. Keep out unnecessary and unprotected personnel. Eliminate all ignition sources. Use grounded, explosion-proof equipment. Increase ventilation to area or move leaking container to a well-ventilated and secure area.

Environmental Precautions

If the spill is inside a building, prevent product from entering drains, ventilation systems and confined areas.

Methods and Materials for Containment and Cleaning Up

*Leak Precaution: dyke to control spillage and prevent environmental contamination
Handling Spill: Ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal.*

Other Information

Report spills to local health, safety and environmental authorities, as required.

7. HANDLING & STORAGE

Precautions for Safe Handling

Never cut, drill, weld or grind on or near this container. Similar products (n-methyl pyrrolidone is not known to) react with oxygen in the air to form explosive peroxides. Keep containers 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.

Avoid generating or breathing product mist; if mist forms in use, install ventilation to control air concentration to regulated limits. Avoid contact with skin & wash work clothes frequently. Make an eye bath & safety shower available near the workplace.

Warning: Exercise 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 & into the body.

Conditions for Safe Storage

Store & use in a cool, dry environment, away from sources of ignition, strong acids or strong alkalis & oxidizing agents.

8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV 100ppm / 400mg/m³
ACGIH TLV not listed
OSHA PEL not listed

Ontario STEV not listed
ACGIH STEL not listed
OSHA STEL not listed

Ventilation	<i>mechanical ventilation may be required to control airborne titre; depending on handling procedures</i>
Hands	<i>wear butyl gloves – other types may also protect; always confirm suitability with supplier.</i>
Eyes	<i>Safety glasses with side shields – always protect the eyes</i>
Clothing	<i>wear impermeable (above) apron, boots, & long sleeves if there is any danger of splashing</i>

Appropriate Engineering Controls

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

9. PHYSICAL PROPERTIES

Appearance	<i>Clear colourless, hygroscopic liquid.</i>
Odour	<i>mild amine odour</i>
Odour threshold	<i>not known</i>
pH	<i>7.7-8.0 (10% solution)</i>
Melting Point/Freezing Point	<i>-24°C / -12°F</i>
Initial Boiling Point/Range	<i>202°C / 396°F; also 204°C / 399°F</i>
Flash Point	<i>91°C / 196°F (Pensky Martens closed cup); 95°C / 203°F (open cup)</i>
Evaporation Rate	<i>0.06 (Butyl Acetate =1)</i>
Flammability (Solid, Gas)	<i>Not Available</i>
Upper/Lower Flammability or Explosive Limit	<i>1.3% – 9.5%</i>
Vapour Pressure	<i>0.29mmHg / 0.039kPa (20°C / 68°F); also 0.23-0.24mmHg / 0.031-0.032kPa (20°C / 68°F)</i>
Vapour Density (air = 1)	<i>3.4</i>
Relative Density (water = 1)	<i>1.03kg/litre (25°C / 77°F)</i>
Water Solubility	<i>complete, also 1000g/litre (230°C / 68°F). Also soluble in most organic solvents, limited solubility in aliphatic hydrocarbons</i>
Partition Coefficient, n-Octanol/Water (Log Kow)	<i>-0.38</i>
Auto-ignition Temperature	<i>>245°C / >473°F; 270°C / 518°F – various values reported</i>
Conversion Factor	<i>1ppm = 4.05mg/m³</i>
Viscosity	<i>1.8centipoise (20°C / 68°F)</i>

Physical State	<i>Liquid</i>
Molecular Weight	<i>99 grams per mole</i>
Molecular Formula	<i>C5H9NO</i>

10. REACTIVITY

Dangerously Reactive *with strong oxidising agents.*

Also Reactive *with strong acids or alkalis cause vigorous hydrolysis to irritating 4-aminobutanoic acid.*

Chemical Stability

Stable; will not polymerize

Possibility of Hazardous Reactions

Exothermic reaction. Reacts with strong acids and alkalis. Reacts with oxidizing agents..

Conditions to Avoid

Avoid all sources of ignition: heat, sparks, open flame.

Mechanical Impact

not sensitive

11. TOXICITY

Acute Toxicity	
LD₅₀ (oral)	<i>3900 & 4150mg/kg (rat), 3500mg/kg (rabbit), 4400mg/kg (guinea pig), 5300mg/kg (mouse)</i>
LD₅₀ (skin)	<i>8000mg/kg (rabbit), >5000mg/kg (rat)</i>
LC₅₀ (inhalation)	<i><5100mg/m³ (rat)¹; part vapour, part mist – no mortality occurred</i>

Skin Corrosion/Irritation

mildly irritating to skin.

Serious Eye Damage/Irritation

liquid moderately irritating; vapour slightly irritating at 15ppm, severely so above 50ppm.

STOT (Specific Target Organ Toxicity) - Single Exposure

Inhalation

above 16ppm caused discomfort; above 49ppm described as “unbearable”

Skin Absorption

*readily, but no toxicity expected by this route **Warning:** Helps carry other substances through skin into the body.*

Ingestion

not known, likely to be only slightly toxic – not a route of industrial exposure.

STOT (Specific Target Organ Toxicity) - Repeated Exposure

Prolonged exposure causes irritation, swelling, peeling skin, wrinkling & stinging; these symptoms probably caused by the vigorous removal of water from the skin by NMP.

Respiratory and/or Skin Sensitization

not a sensitizer in humans or animals.

Carcinogenicity

not considered a tumorigen or a carcinogen in humans or animals.

Reproductive Toxicity

Sexual Function and Fertility

no known effect in humans; reproductive issues in rats on oral administration – see NOAEL below

Germ Cell Mutagenicity

Not known to be a mutagen.

NOAEL (developmental): 160mg/kg/day (rat, oral) - not a route of industrial exposure

NOAEL (fertility): 150 & 350mg/kg/day (rat, oral) - not a route of industrial exposure

NOAEL (male fertility): 1000mg/kg/day (rat, oral) - not a route of industrial exposure

NOAEC (developmental): 500, 540 & 300mg/m³/6hr/day (rabbit, gestation day 7-19); 1000, 175 & 1000mg/m³ (rabbit, maternal toxicity in the above reports)

NOAEC (developmental): 247mg/m³/6hr/day (rat, gestation day 6-20); 123mg/m³ (rat, maternal toxicity)

12. ECOLOGICAL INFORMATION

Bioaccumulation	rapidly eliminated from living organisms (~24 hour); cannot bioaccumulate
Persistence and Degradability	Biodegradation - biodegrades readily in the presence of oxygen: 73% in 28 days, 88% in 30 days, >92% in 14 days, 90% in 5 days, & 50% in 4 days; ½-life 4-12 days in soil Abiotic Degradation - reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 5 hours & 17hours
Mobility in soil, water	water soluble; moves readily in soil & water
Aquatic Toxicity	
LC50 (Fish, 96hr)	832mg/litre (<i>Lepomis macrochirus</i>), >500 & 3048mg/litre (<i>Oncorhynchus mykiss</i>), 4000mg/litre <i>Leuciscus idus</i>), 1072mg/litre (<i>Pimephales promelas</i>), 1400 & 2673mg/litre (<i>Poecilia reticulata</i>)
EC50 (Crustacea, 48hr)	4897mg/litre (<i>Daphnia magna</i>), 4655mg/litre (<i>Gammarus sp</i>), 1107mg/litre (<i>Paleomonetes vulgaris</i>)
EC50 (Algae)	600mg/litre (<i>Desmodesmus subspicatus</i>)
EC50 (Bacteria)	>600mg/litre (industrial sewage sludge)
TDK (Bacteria)	9000mg/litre (<i>Pseudomonas putida</i>), >100mg/litre (sewage sludge)

13. DISPOSAL

Water Disposal

Do not flush to sewer, recycle if possible, incinerate in approved facility with flue gas monitoring & scrubbing; rapid biodegradation makes biological treatment a viable alternative.

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

Canada TDG	PIN	Not regulated for transport	 U.S. only
U.S.A. 49 CFR *	PIN Shipping Name	NA1993 Combustible Liquid, n.o.s. (n- Methyl Pyrrolidone)	
	Class & Packing Group	Combustible, PG III	

**Not regulated in Non - Bulk Packages, 49 CFR 173.150(f)(2)*

Marine Pollutant ERAP Required Reportable Quantity E R G No.	Not a Marine Pollutant NO NO 128	
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15. REGULATIONS

Canada DSL U.S.A. TSCA Europe EINECS	On Inventory On Inventory On Inventory
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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.

U.S. State Regulations

Pennsylvania Right To Know: METHYL-N 2-PYRROLIDONE (872-50-4)

New Jersey Right To Know: METHYL-N 2-PYRROLIDONE (872-50-4)

California Prop 65: WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive

Global Regulations

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Chinal	ECSC	Compliant

Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
Taiwan	TCSCA	Compliant

16. OTHER INFORMATION

NFPA RATING	Health 2	Flammability 2	Instability 0
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Prepared for Megaloid Laboratories Limited by Richard Koscher
 Preparation Date: July 2005
 Revision Dates: July 2008, July 2011, July 2014, July 2017, Feb 2019

Key to Abbreviations	<p>ACGIH® = American Conference of Governmental Industrial Hygienists AIHA® = AIHA® Guideline Foundation HSDB® = Hazardous Substances Data Bank IARC = International Agency for Research on Cancer NFPA = National Fire Protection Association NIOSH = National Institute for Occupational Safety and Health NTP = National Toxicology Program OSHA = US Occupational Safety and Health Administration RTECS® = Registry of Toxic Effects of Chemical Substances</p>
References	<p>CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). HSDB® database. US National Library of Medicine. Available from Canadian Centre for Occupational Health and Safety (CCOHS). NIOSH Pocket Guide database. National Institute for Occupational Safety and Health. Available from Canadian Centre for Occupational Health and Safety (CCOHS). Registry of Toxic Effects of Chemical Substances (RTECS®) database. Dassault Systèmes/BIOVIA ("BIOVIA"). Available from Canadian Centre for Occupational Health and Safety (CCOHS).</p>
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