Established in 1981 megaloid laboratories limited
2221 Ninth Line | Oakville, ON L6H 7G7
Phone: 905-337-7411 | Fax: 905-337-1686
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Material Safety Data for: n-Methyl Pyrrolidone

1. PRODUCT INDENTIFICATION

Name	**1-methyl-2-pyrrolidone**
Synonyms	**NMP, n-methyl-gamma-butyrolactam, 1-methyl-2-pyrrolidinone & others**
CAS#	**872-50-4**
Europe EC#	**212-828-1**
Product Uses	**petroleum refining, desulphurization, coatings, and others**

2. INGREDIENTS

	%	TWAEV / TLV mg/m^3	LD_{50} ORAL	(mg/kg) SKIN	LC_{50} ppm INHALATION
1-methyl;-2-pyrrolidone	100%	10 / 40 (skin)	3900	8000	not known

3. (a) HAZARDS SUMMARY

Hazards, Quick Guide: flammable liquid, heavy vapour may travel, distant ignition and flashback are possible, enhances skin absorption of other substances

Canada – WHMIS	**B 3, D 2B**
Key:	***B 2*** *– Flash Point <38°C,* ***B 3*** *– Flash Point >38°C & <93°C*
	D 1 *– Immediately Toxic,* ***D 2*** *– Chronic Toxicity*
	C *– Oxidising Substance,* ***E -*** *Corrosive*
U.S.A. – HMIS	**Health – 1, Fire – 2, Reactivity – 0**
Key:	***0****=minimal,* ***1****=slight,* ***2****=moderate,* ***3****=serious,* ***4****=severe*

3. (b) HAZARDS – TOXICITY

Effects, Acute Exposure

Skin Contact	mildly irritating to skin
Skin Absorption	readily; nevertheless, no toxic effects expected by this route; ***Warning: May help to carry other substances across the skin and into the body.***
Eye Contact	liquid moderately irritating; vapour slightly irritating at 15ppm, severely so above 50ppm
Inhalation	16ppm and over caused discomfort; 49ppm and over described as "unbearable"
Ingestion	not known, likely to be only slightly toxic – *not a route of industrial exposure*

Effects, Chronic Exposure

General	prolonged exposure may cause irritation, swelling, peeling skin, wrinkling & stinging; symptoms probably caused by NMPs vigorous absorption of water
Sensitising	not a sensitiser 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 effect in rodents only in presence of generalised toxicity
Mutagen	no known effect on humans or animals
Synergistic With	not known
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*

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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 promptly if there is 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. 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
Viscosity	1.8centipoise (20°C / 68°F)
pH	7.7-8.0 (10% solution)
Conversion Factor	1ppm = 4.05mg/m^3
Molecular Weight	99grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	>90°C / >194°F (closed cup)
Autoignition Temperature	>245°C / >473°F – *various values reported*
Flammable Limits	1.3% – 9.5%
Combustion Products	carbon monoxide, nitrogen oxides, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	foam, dry chemical, water fog, water spray only to cool & dilute, water jet may spread flames; fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

7. STABILITY / 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

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH WEEL	10ppm / 40mg/m^3 (skin)
OSHA PEL	not listed
STEL	not listed
Ventilation	no special ventilation required
Hands	butyl rubber gloves recommended – *other types may also protect; consult supplier to confirm suitability*
Eyes	safety glasses with side shields – *always protect the eyes*
Clothing	no special protective clothing required

9. 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 and 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, or part 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 toxic substances dissolved in n-methyl pyrrolidone (NMP). Although NMP itself has low toxicity, it may facilitate the transport of other (potentially toxic) substances across the skin and into the body.

10. SPILL PROCEDURES

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

11. DISPOSAL

Waste Disposal	**do not flush to sewer**, recycle solvent if possible, may be incinerated in approved facility
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***

12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is rapidly eliminated from living organisms (~24 hour) and cannot bioaccumulate
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; soil ½-life 4-12 days, biodegradation in water 73% complete in 4 weeks
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated ½-life in air is 5 days
Mobility in soil, water	this product is water soluble and will move readily in soil and water
Aquatic Toxicity	
LC_{50} (Fish, 96hr)	832mg/litre (Lepomis macrochirus), 4000mg/litre Leuciscus idus), 1072mg/litre (Pimephales promelas), 1400 & 2673mg/litre (Poecilia reticulata), 3048mg/litre (Salmo gairdneri)
EC_{50} (Crustacea, 48hr)	4897mg/litre (Daphnia magna), 4655mg/litre (Gammarus sp), 1107mg/litre (Paleomonetes vulgaris)
EC_{50} (Algae)	>500mg/litre (Scenedesmus subspicatus)

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13. TRANSPORT REGULATIONS

Canada TDG	**PIN**	**UN- not regulated for transport**
AND	**Shipping Name**	**not regulated for transport**
U.S.A. 49 CFR	**Class**	**not regulated for transport**
	Packing Group	**not regulated for transport**
Marine Pollutant		**not a marine pollutant**

14. EMERGENCY INFORMATION

Canada	**Call CANUTEC (collect)**	**(613) 996-6666**
U.S.A.	**Call CHEMTREC**	**(800) 424-9300**

15. REGULATIONS

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

Europe Risk Phrases: **R: 36/37/38, 61 –** *Irritating to eyes, skin & respiratory system. May cause harm to the unborn child.*

Europe Safety Phrases: **S: 45, 53 –** *In case of accident or if you feel unwell, seek medical advice immediately. Avoid exposure – obtain special instructions before use.*

TSCA Requirements: A testing consent order is in effect for n-methylpyrrolidone for health effects testing. FR citation: 11/23/93.

16. PREPARATION INFORMATION

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

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