

## MATERIAL SAFETY DATA SHEET

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Version 1.11

## Section 1 - Product and Company Information

Product Name	1-METHYL-2-PYRROLIDINONE
Product Number	M6762
Brand	SIGMA
Company	Sigma-Aldrich
Address	3050 Spruce Street SAINT LOUIS MO 63103 US
Technical Phone:	800-325-5832
Fax:	800-325-5052
Emergency Phone:	314-776-6555

## Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
1-METHYL-2-PYRROLIDINONE	872-50-4	Yes
Formula	C5H9NO	
Synonyms	N-Methylpyrrolidinone * N-Methyl-2-pyrrolidinone * 1-Methyl-2-pyrrolidinone * 1-Methyl-5-pyrrolidinone * N-Methylpyrrolidone * N-Methyl-alpha-pyrrolidone * N-Methyl-2-pyrrolidone * 1-Methyl-2-pyrrolidone * M-Pyrol * NMP	
RTECS Number:	UY5790000	

## Section 3 - Hazards Identification

## EMERGENCY OVERVIEW

Irritant.

Irritating to eyes and skin.

Combustible. Target organ(s): Bone marrow. Spleen. Calif. Prop. 65 developmental hazard.

## HMIS RATING

HEALTH: 2\*

FLAMMABILITY: 2

REACTIVITY: 1

## NFPA RATING

HEALTH: 2

FLAMMABILITY: 2

REACTIVITY: 1

\*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

## Section 4 - First Aid Measures

## ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is

conscious. Call a physician.

#### INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

#### DERMAL EXPOSURE

In case of contact, immediately wash skin with soap and copious amounts of water.

#### EYE EXPOSURE

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

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### Section 5 - Fire Fighting Measures

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#### FLAMMABLE HAZARDS

Flammable Hazards: Yes

#### FLASH POINT

195.8 °F    91 °C    Method: closed cup

#### EXPLOSION LIMITS

Lower: 1.3 %    Upper: 9.5 %

#### AUTOIGNITION TEMP

270 °C

#### FLAMMABILITY

N/A

#### EXTINGUISHING MEDIA

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

#### FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.  
Specific Hazard(s): Emits toxic fumes under fire conditions.  
Combustible liquid.

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### Section 6 - Accidental Release Measures

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#### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

#### METHODS FOR CLEANING UP

Absorb on sand or vermiculite and place in closed containers for disposal. Ventilate area and wash spill site after material pickup is complete.

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### Section 7 - Handling and Storage

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#### HANDLING

User Exposure: Do not breathe vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

#### STORAGE

Suitable: Keep tightly closed. Keep away from heat and open flame.

Store at 2-8°C

#### SPECIAL REQUIREMENTS

Store under inert gas. Moisture sensitive.

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#### Section 8 - Exposure Controls / PPE

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#### ENGINEERING CONTROLS

Mechanical exhaust required. Safety shower and eye bath.

#### PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

#### GENERAL HYGIENE MEASURES

Wash thoroughly after handling.

#### EXPOSURE LIMITS

Country	Source	Type	Value
Poland		NDS	120 mg/m3
Poland		NDSCh	240 mg/m3
Poland		NDSP	

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#### Section 9 - Physical/Chemical Properties

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Appearance                      Physical State: Liquid  
Color: Colorless

Property	Value	At Temperature or Pressure
Molecular Weight	99.13 AMU	
pH	7.7 - 8.0	
BP/BP Range	78.0 - 79.0 °C	12 mmHg
MP/MP Range	- 24.0 °C	
Freezing Point	- 23.6 °C	
Vapor Pressure	0.29 mmHg	20 °C
Vapor Density	3.4 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	1.032 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	100 %	
Water Content	< 0.01 %	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	0.002 Pas	20 °C
Surface Tension	40.7 mN/m	
Partition Coefficient	Log Kow: - 0.460	
Decomposition Temp.	N/A	
Flash Point	195.8 °F 91 °C	Method: closed cup
Explosion Limits	Lower: 1.3 %	

Flammability	Upper: 9.5 %
Autoignition Temp	N/A
Refractive Index	270 °C
Optical Rotation	1.47
Miscellaneous Data	N/A
Solubility	N/A
	Other Solvents: MISCIBLE IN WATER, LOWER ALCOHOLS AND KETONE ETHYL ACETATE, CHLOROFORM BENZENE

N/A = not available

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## Section 10 - Stability and Reactivity

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### STABILITY

Stable: Stable.

Conditions to Avoid: Moisture.

Materials to Avoid: Strong acids, Strong oxidizing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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## Section 11 - Toxicological Information

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### ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes eye irritation.

Inhalation: Material may be irritating to mucous membranes and upper respiratory tract. May be harmful if inhaled.

Ingestion: May be harmful if swallowed.

### TARGET ORGAN(S) OR SYSTEM(S)

Bone marrow. Thymus. Spleen. Lymphatic system.

### SIGNS AND SYMPTOMS OF EXPOSURE

Prolonged exposure can cause: Stomach pains, vomiting, diarrhea.

Rats exposed to 1-methyl-2-pyrrolidinone at a concentration of 1 mg/L as an aerosol for 10 days showed depletion of hematopoietic cells in the bone marrow and atrophy of the lymphoid tissues of the thymus, spleen, and lymph nodes.

### TOXICITY DATA

Inhalation

Rat

> 5,100 ppm

LDLO

Oral

Rat

3914 mg/kg

LD50

Intraperitoneal

Rat

2472 MG/KG

LD50

Subcutaneous

Rat  
>2 GM/KG  
LD50

Intravenous  
Rat  
80500 UG/KG  
LD50

Oral  
Mouse  
5130 mg/kg  
LD50

Intraperitoneal  
Mouse  
3050 MG/KG  
LD50

Intravenous  
Mouse  
54500 UG/KG  
LD50

Intravenous  
Dog  
63300 UG/KG  
LD50

Skin  
Rabbit  
8000 mg/kg  
LD50

#### IRRITATION DATA

Eyes  
Rabbit  
100 mg  
Remarks: Moderate irritation effect

#### CHRONIC EXPOSURE - CARCINOGEN

Species: Mouse  
Route of Application: Oral  
Dose: 784 GM/KG  
Exposure Time: 78W  
Frequency: C  
Result: Tumorigenic: Carcinogenic by RTECS criteria. Liver: Tumors.

#### CHRONIC EXPOSURE - TERATOGEN

Species: Rat  
Dose: 9700 MG/KG  
Route of Application: Oral  
Exposure Time: (6-15D PREG)  
Result: Effects on Embryo or Fetus: Fetal death. Specific  
Developmental Abnormalities: Other developmental abnormalities.

Species: Rat  
Dose: 116 PPM/6H  
Route of Application: Inhalation

Exposure Time: (MULTIGENERATIONS)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

#### CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Species: Rat  
Dose: 150 PPM/6H  
Route of Application: Inhalation  
Exposure Time: (7-20D PREG)  
Result: Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Delayed effects.

Species: Rat  
Dose: 7500 MG/KG  
Route of Application: Skin  
Exposure Time: (6-15D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus).

Species: Rat  
Dose: 7500 MG/KG  
Route of Application: Skin  
Exposure Time: (6-15D PREG)  
Result: Maternal Effects: Other effects. Specific Developmental Abnormalities: Musculoskeletal system.

Species: Rat  
Dose: 166 MG/KG  
Route of Application: Intraperitoneal  
Exposure Time: (9D PREG)  
Result: Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system. Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Mouse  
Dose: 12825 MG/KG  
Route of Application: Oral  
Exposure Time: (11-15D PREG)  
Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse  
Dose: 7625 MG/KG  
Route of Application: Intraperitoneal  
Exposure Time: (11-15D PREG)  
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Craniofacial (including nose and tongue).

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#### Section 12 - Ecological Information

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#### ACUTE ECOTOXICITY TESTS

Test Type: EC50 Daphnia  
Species: Daphnia magna  
Time: 24 h  
Value: > 1,000 mg/l

Test Type: IC50 Algae  
Time: 72 h  
Value: > 500 mg/l

Test Type: LC50 Bacteria  
Value: > 9,000 mg/l

Test Type: LC50 Fish  
Time: 96 h  
Value: 4,000 mg/l

Test Type: LC50 Fish  
Species: Leuciscus idus  
Time: 96 h  
Value: > 500 mg/l

#### ELIMINATION

Elimination: 90 %

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#### Section 13 - Disposal Considerations

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##### APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

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#### Section 14 - Transport Information

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##### DOT

Proper Shipping Name: Combustible liquid, n.o.s.  
UN#: NA1993  
Class: COMBUSTIBLE LIQUID  
Packing Group: Packing Group III  
Hazard Label: None  
PIH: Not PIH

##### IATA

Non-Hazardous for Air Transport: Non-hazardous for air transport.

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#### Section 15 - Regulatory Information

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##### EU DIRECTIVES CLASSIFICATION

Symbol of Danger: Xi  
Indication of Danger: Irritant.  
R: 36/38  
Risk Statements: Irritating to eyes and skin.  
S: 41  
Safety Statements: In case of fire and/or explosion do not breathe fumes.

##### US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Irritant.  
Risk Statements: Irritating to eyes and skin.

Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing. In case of fire and/or explosion do not breathe fumes.

US Statements: Combustible. Target organ(s): Bone marrow.

Spleen. Calif. Prop. 65 developmental hazard.

#### UNITED STATES REGULATORY INFORMATION

SARA LISTED: Yes

DEMINIMIS: 1 %

NOTES: This product is subject to SARA section 313 reporting requirements.

TSCA INVENTORY ITEM: Yes

#### UNITED STATES - STATE REGULATORY INFORMATION

##### CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause developmental toxicity. This product is or contains chemical(s) known to the state of California to cause developmental toxicity.

#### CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

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#### Section 16 - Other Information

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#### DISCLAIMER

For R&D use only. Not for drug, household or other uses.

#### WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.