

1. PRODUCT IDENTIFICATION

<u>TRADE NAME (AS LABELED):</u>	N-methylpyrrolidinone (NMP)
<u>CHEMICAL NAME/CLASS/SYNONYMS:</u>	1-Methyl-2-Pyrrolidinone; N-methyl-2-pyrrolidone; M-Pyrol NMP
<u>PRODUCT NUMBER:</u>	N/A
<u>U.N. NUMBER:</u>	Not regulated for transport
<u>U.N. DANGEROUS GOODS CLASS/SUBSIDIARY RISK:</u>	
<u>MANUFACTURER'S NAME:</u>	NuGeneration Technologies, LLC
<u>ADDRESS:</u>	1155 Park Avenue, Emeryville, CA 94608 USA
<u>EMERGENCY PHONE:</u>	(800) 424-9300 (CHEMTREC)
<u>BUSINESS PHONE:</u>	(888) 996-8436 (Product Information)
<u>DATE OF PREPARATION:</u>	May 3, 2004
<u>DATE OF LAST REVISION:</u>	October 25, 2010 - Rev 4

2. COMPOSITION and INFORMATION ON INGREDIENTS

Hazardous Ingredients:	CAS #	EC #	ICSC #	WT %	Hazard Symbol; Risk Phrases
N-methylpyrrolidinone (NMP)	872-50-4	212-828-1		100%	HAZARD CLASSIFICATION: HARMFUL (X) RISK PHRASES: R36, R37, R38

NOTE: ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. 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, EU Directives and the Japanese Industrial Standard *JIS Z 7250: 2000*.

See Section 3 for full text of Risk Phrases and Safety Phrases

3. HAZARD IDENTIFICATION

EU LABELING AND CLASSIFICATION: This product meets the definition of the following hazard class as defined by the European Economic Community Guidelines.

EU CLASSIFICATION: Harmful (X)

EU RISK PHRASES: R36/37/38 Irritating to eyes, respiratory system and skin.



EU SAFETY PHRASES: S2- Keep out of the reach of children. S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 37/39 Wear suitable gloves and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 53 Avoid exposure - obtain special instructions before use. S46- If swallowed, seek medical advice immediately and show this container or label.

EMERGENCY OVERVIEW: Warning! Causes eye, skin, and respiratory tract irritation.

May cause harm to the unborn child. Combustible liquid and vapor.

May be harmful if swallowed, inhaled, or absorbed through the skin.

Light sensitive.

Hygroscopic (absorbs moisture from the air).

Target Organs: Respiratory system, eyes, skin.

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SYMPTOMS OF OVEREXPOSURE BY ROUTE OF EXPOSURE: Routes of entry for solids and liquids include eye and skin contact, ingestion and inhalation. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases

INHALATION: Causes respiratory tract irritation. May cause headache. Material has a very low vapor pressure at room temperature, so inhalation exposures are not expected unless material is heated or misted.

CONTACT WITH SKIN or EYES: Prolonged or repeated skin contact may cause irritation. Contact with eyes may cause inflammation and redness.



INGESTION: May cause gastrointestinal irritation with nausea, vomiting and diarrhea.

HEALTH EFFECTS OR RISKS FROM EXPOSURE:

ACUTE: Contact with skin or eyes may cause burning and irritation. Inhalation will cause respiratory irritation.

CHRONIC: The substance may be toxic to blood, kidneys, lymphatic system, Urinary system, bone marrow. Repeated or prolonged exposure to the substance can produce target organs damage.

TARGET ORGANS: **Acute:** Skin, eyes and respiratory system. **Chronic:** Skin, eyes and target organs.

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD		(BLUE)	2
FLAMMABILITY HAZARD		(RED)	2
PHYSICAL HAZARD		(YELLOW)	0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	SEE SECTION 8		SEE SECTION 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate
3 = Serious 4 = Severe * = Chronic hazard

4. FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

SKIN EXPOSURE: Wash affected areas thoroughly with soap and water. Immediate medical attention required.

EYE EXPOSURE: In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

INHALATION: remove contaminated individual to fresh air. If breathing is difficult, give oxygen. Seek medical attention.

INGESTION: Rinse mouth and then drink plenty of water. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: Skin and respiratory disorders, as well as conditions involving the "Target Organs" (see Section 3, Hazard Identification) may be aggravated by prolonged overexposures to this product.

RECOMMENDATIONS TO PHYSICIANS: Treat symptoms and eliminate overexposure.

5. FIRE-FIGHTING MEASURES

FLASH POINT: 93 C (199 F)

Flammability Rating: Combustible.

AUTOIGNITION TEMPERATURE: 346 C (655 F)

FLAMMABLE LIMITS (in air by volume, %): 1.3 LEL, 9.5 UEL

FIRE EXTINGUISHING MATERIALS: Use fire extinguishing materials appropriate for surrounding fire.

Water Spray: Yes

Foam: Yes

Halon: Yes

Carbon Dioxide: Yes

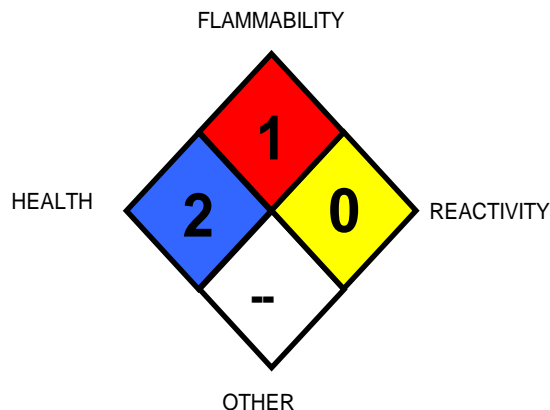
Dry Chemical: Yes

Other: Any "C" Class

UNUSUAL FIRE AND EXPLOSION HAZARDS: Above the flash point, explosive vapor-air mixtures may be formed.

SPECIAL FIRE-FIGHTING PROCEDURES: Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

NFPA RATING



6. ACCIDENTAL RELEASE MEASURES

SPILL AND LEAK RESPONSE: Uncontrolled releases should be responded to by appropriately trained personnel using pre-planned procedures. Proper protective equipment should be used.

Remove all sources of ignition. Ventilate area of leak or spill. Keep unnecessary and unprotected people away from area of spill. Wear appropriate protective equipment as specified in section 8.

Spills Pick up and place in suitable container for reclamation or disposal, using a method that does not generate dust. U.S. Regulations (CERCLA) requires porting spills and releases of soil, water and air in excess of reportable quantities. Prevent entry into sewers, basements or confined areas, dike if needed. Dispose of in accordance with U.S. Federal, State, and local hazardous waste disposal regulations; those of Canada and its Provinces, those of Australia, Japan and EU Member States (see Section 13, Disposal Considerations).

7. HANDLING and STORAGE

WORK PRACTICES AND HYGIENE PRACTICES: As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

STORAGE AND HANDLING PRACTICES: All employees who handle this material should be trained to handle it safely. Avoid contact with eyes, skin, and clothing. Empty drums should be completely drained (triple rinsed), properly bunged, and promptly returned to a drum reconditioner, or disposed of properly. Open containers slowly on a stable surface. Containers of this product must be properly labeled. Storage areas of this product should be clearly identified, well-illuminated, clear of obstruction and accessible only to trained and authorized personnel. Store containers in a cool, dry location away from direct sunlight at temperatures between 39°F - 120°F. Keep product from freezing. Keep container tightly closed when not in use. Observe all warnings and precautions listed for this product.



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8. EXPOSURE CONTROLS - PERSONAL PROTECTION

VENTILATION AND ENGINEERING CONTROLS: Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use a chemical fume hood or local exhaust ventilation, and process enclosure if necessary, to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

EXPOSURE LIMITS/GUIDELINES:

CHEMICAL NAME	CAS #	EXPOSURE LIMITS IN AIR									
		ACGIH-TLVs		OSHA-PELs		NIOSH-RELs		NIOSH	AIHA WEELs		OTHER
		TWA ppm	STEL ppm	TWA ppm	STEL ppm	TWA ppm	STEL ppm	IDLH ppm	TWA ppm	STEL ppm	ppm
NMP	872-50-4	NE	NE	NE	NE	NE	NE	NE	10	40	25 STEL: 75 (ppm) [United Kingdom (UK)]

NE = Not Established.

NIC = Notice of Intended Change

See Section 16 for Definitions of Terms Used.

The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.

RESPIRATORY PROTECTION: Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states. Oxygen levels below 19.5% are considered IDLH by OSHA. In such atmospheres, use of a full-facepiece pressure/demand SCBA or a full facepiece, supplied air respirator with auxiliary self-contained air supply is required under U.S. Federal OSHA's Respiratory Protection Standard (1910.134-1998) or the regulations of various U.S. States, Canada, EU Member States, or those of Japan. Air-purifying respirators with dust/mist/fume filters are recommended if operations may produce mists or sprays from this product.

EYE PROTECTION: Safety goggles. If necessary, refer to U.S. OSHA 29 CFR 1910.133, Canadian Standards, and the European Standard EN166, Australian Standards, or relevant Japanese Standards. Maintain eye wash fountain and quick drench facilities in the work area.

HAND PROTECTION: Use chemically-resistant gloves when handling this product. If necessary, refer to U.S. OSHA 29 CFR 1910.138, the European Standard DIN EN 374, the appropriate Standards of Canada, Australian Standards, or relevant Japanese Standards.

BODY PROTECTION: Use body protection appropriate for task (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards. If a hazard of injury to the feet exists due to falling objects, rolling objects, where objects may pierce the soles of the feet or where employee's feet may be exposed to electrical hazards, use foot protection, as described in U.S. OSHA 29 CFR 1910.136.

9. PHYSICAL and CHEMICAL PROPERTIES

BULK DENSITY: 9.58 lbs/gallon

SPECIFIC GRAVITY @ 20°C: 1.026 (water=1)

SOLUBILITY IN WATER: miscible (soluble in organic solvents)

VAPOR PRESSURE, hPa @ 20°C (68°F): 0.5

pH: 8.0-10.0 at 10%

ODOR: mild amine-like

APPEARANCE and COLOR: Liquid / Clear

Molecular Formula: C₅H₉NO

EVAPORATION RATE (n-BuAc=1): 0.06

MELTING POINT: -24°C (-11°F)

BOILING POINT: 202° C (396°F)

Vapor Density (Air=1): 3.4

Viscosity: 1.65 cps @ 25 deg C

Viscosity, dynamic: 1.796 mPa.s (20C)

% Volatiles by volume @ 21C (70F): 100

Molecular Weight: 99.13

10. STABILITY and REACTIVITY

STABILITY: Stable under normal conditions.

DECOMPOSITION PRODUCTS: Nitrogen oxides, carbon monoxide, carbon dioxide when heated to decomposition.

MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE: strong acids, strong oxidizing agents.

HAZARDOUS POLYMERIZATION: Not know to occur.

CONDITIONS TO AVOID: Light, ignition sources, excess heat, exposure to moist air or water.

11. TOXICOLOGICAL INFORMATION

RTECS#:

CAS# 872-50-4: UY5790000

LD50/LC50:

CAS# 872-50-4:

Draize test, rabbit, eye: 100 mg Moderate;

Oral, mouse: LD50 = 5130 mg/kg;

Oral, rat: LD50 = 3914 mg/kg;

Skin, rabbit: LD50 = 8 gm/kg;

Sensitization test (guinea pig): negative; Patch test (humans): negative.(Merck)

Carcinogenicity:

CAS# 872-50-4: Not listed by ACGIH, IARC, NTP, or CA Prop 65.

Epidemiology: No data available.

Teratogenicity: Proposition 65 maximum allowable dose level for developmental toxicity for N-methylpyrrolidinone is 3,200 ug/day for the inhalation route and 17,000 ug/day for the dermal route.

Reproductive Effects: See actual entry in RTECS for complete information.

Mutagenicity: See actual entry in RTECS for complete information.

Neurotoxicity: No data available.

Chronic toxicity

Repeated dose toxicity: Genetic toxicity:

In the majority of studies performed with microorganisms and in mammalian cell culture, a mutagenic effect was not found. A mutagenic effect was also not observed in in vivo tests.

Carcinogenicity: Results from a number of long-term carcinogenicity studies and short-term tests are available. Taking into account all of the information, there is no indication that the substance itself is carcinogenic.

Reproductive toxicity: The results of animal studies gave no indication of a fertility impairing effect.

Developmental toxicity/teratogenicity: Indications of a developmental toxic / teratogenic effect were seen in animal studies.

12. ECOLOGICAL INFORMATION



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Environmental fate and transport

Biodegradation:

Test method: OECD 301E/92/69/EEC, C.4-B

Method of analysis: DOC reduction

Degree of elimination: > 90 %

Evaluation: Readily biodegradable.

Chemical oxygen demand (COD): 1,600 mg/l

Biochemical oxygen demand (BOD): Incubation period 5 d: < 2 mg/g

Adsorbable organically-bound halogen (AOX): This product contains no organically-bound halogen.

Environmental toxicity

Acute and prolonged toxicity to fish: golden orfe/LC50 (96 h): > 500 mg/l

Acute toxicity to aquatic invertebrates: Daphnia magna/EC50 (24 h): > 1,000 mg/l

Toxicity to aquatic plants: green algae/EC50 (72 h): > 500 mg/l

Toxicity to microorganisms: OECD Guideline 209 bacterium/EC20 (30 min): > 600 mg/l Inhibition of degradation activity in activated sludge is not to be anticipated during correct introduction of low concentrations.

13. DISPOSAL CONSIDERATIONS

Waste disposal of substance:

Must be dumped or incinerated in accordance with local regulations. Incinerate or dispose of in a RCRA-licensed facility. Do not discharge into waterways or sewer systems without proper authorization.

Container disposal:

Empty containers with less than 1 inch of residue may be land filled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: N/A

14. TRANSPORTATION INFORMATION

US DOT, IATA, IMO, ADR:

PROPER SHIPPING NAME: Non-Regulated Material
HAZARD CLASS NUMBER: N/A
UN IDENTIFICATION NUMBER: N/A PACKING GROUP: N/A
DOT LABEL(S) REQUIRED: N/A

NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER, 2004: --

MARINE POLLUTANT: This product is not designated as a marine pollutant by the Department of Transportation (49 CFR 172.101, Appendix B).

INTERNATIONAL AIR TRANSPORT ASSOCIATION SHIPPING INFORMATION (IATA): This product is NOT considered as dangerous goods.

INTERNATIONAL MARITIME ORGANIZATION SHIPPING INFORMATION (IMO): This product is NOT considered as dangerous goods.

EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR): This product is NOT considered by the United Nations Economic Commission for Europe to be dangerous goods.

15. REGULATORY INFORMATION

UNITED STATES REGULATIONS:

U.S. SARA REPORTING REQUIREMENTS: The components of this product are subject to the reporting requirements of Sections 302, 304, and 313 of Title III of the Superfund Amendments and Reauthorization Act, and are listed as follows:

CHEMICAL NAME	SARA 302 (40 CFR 355, Appendix A)	SARA 304 (40 CFR Table 302.4)	SARA 313 (40 CFR 372.65)
NMP	NO	NO	YES

U.S. SARA THRESHOLD PLANNING QUANTITY: There are no specific Threshold Planning Quantities for the components of this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lbs (4,540 kg) therefore applies, per 40 CFR 370.20.

U.S. CERCLA REPORTABLE QUANTITY (RQ): None

U.S. TSCA INVENTORY STATUS: The components of this product are listed on the TSCA Inventory.

TSCA Significant New Use Rule: None of the chemicals in this material have a SNUR under TSCA.

OTHER U.S. FEDERAL REGULATIONS: Not applicable.

Clean Air Act:

- This material does not contain any hazardous air pollutants.
- This material does not contain any Class 1 Ozone depleters.
- This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

- None of the chemicals in this product are listed as Hazardous Substances under the CWA.
- None of the chemicals in this product are listed as Priority Pollutants under the CWA.
- None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 872-50-4 can be found on the following state right to know lists: New Jersey, Pennsylvania, Minnesota, Massachusetts.

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65): This product contains 1-Methyl-2-pyrrolidinone, a chemical known to the state of California to cause developmental reproductive toxicity. California No Significant Risk Level: None of the chemicals in this product are listed.

WGK (Water Danger/Protection)

CAS# 872-50-4: 1

CANADIAN REGULATIONS:

CANADIAN DSL/NDL INVENTORY STATUS: CAS# 872-50-4 is listed on Canada's DSL List.

CANADIAN WHMIS CLASSIFICATION and SYMBOLS: B3, D2A, D2B



EUROPEAN ECONOMIC COMMUNITY INFORMATION:

EU CLASSIFICATION: Harmful (Xn)

EU RISK PHRASES: R36/37/38 Irritating to eyes, respiratory system and skin.



EU SAFETY PHRASES: S2- Keep out of the reach of children. S 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S 37/39 Wear suitable gloves and eye/face protection. S 45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S 53 Avoid exposure - obtain special instructions before use. S46- If swallowed, seek medical advice immediately and show this container or label.



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EUROPEAN ECONOMIC COMMUNITY INFORMATION FOR CONSTITUENTS: The following information is available for the components of this product. **NMP:** EU EINECS/ELINCS NUMBER: 212-828-1

AUSTRALIAN INFORMATION FOR PRODUCT:

AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS: The components of this product are listed on the AICS.
HAZARDOUS SUBSTANCES INFORMATION SYSTEM: NMP is listed by the Hazardous Substances Information System as a Hazardous Substance.
STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS: Not applicable.
LABELING AND CLASSIFICATION: The product is regulated, based a review of the regulation [NOHSC: 10005 (1994-Current)]:

JAPANESE INFORMATION FOR PRODUCT:

JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS: The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.
JAPANESE ENCS INVENTORY: The components of this product are on the ENCS Inventory as indicated in the section on International Chemical Inventories, below.
POISONOUS AND DELETERIOUS SUBSTANCES CONTROL LAW: No component of this product is a listed Specified Poisonous Substance under the Poisonous and Deleterious Substances Control Law.

INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

NMP is listed on the following inventories:

- Asia-Pac: Listed
- Australian Inventory of Chemical Substances (AICS): Listed
- Korean Existing Chemicals List (ECL): Listed
- Japanese Existing National Inventory of Chemical Substances (ENCS): Listed
- Philippines Inventory of Chemicals and Chemical Substances (PICCS): Listed
- Swiss Giftliste List of Toxic Substances: Listed
- U.S. TSCA: Listed

16. OTHER INFORMATION

PREPARED BY: Donato Polignone
DATE: October 25, 2010

MSDS Authoring Services
SUPERSEDES: October 29, 2009

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End of MSDS