



# 1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate

## GFS CHEMICALS INC

Version No: 5.5

Safety Data Sheet according to OSHA HazCom Standard (2024) requirements

Chemwatch Hazard Alert Code: 3

Initial Date: 28/07/2025

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L.GHS.USA.EN

### SECTION 1 Identification

#### Product Identifier

Product name	1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate
Chemical Name	Not Available
Synonyms	Not Available
Chemical formula	C5H9NO
Other means of identification	Not Available
CAS number	872-50-4

#### Recommended use of the chemical and restrictions on use

Relevant identified uses	Laboratory reagent
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#### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

Registered company name	GFS CHEMICALS INC
Address	155 Hidden Ravines Dr., Powell OH 43065 Columbus OH United States
Telephone	+1 740-881-5501
Fax	Not Available
Website	<a href="http://www.gfschemicals.com">www.gfschemicals.com</a>
Email	<a href="mailto:service@gfschemicals.com">service@gfschemicals.com</a>

#### Emergency phone number

Association / Organisation	Chemtrec
Emergency telephone number(s)	(800)262-8200
Other emergency telephone number(s)	Not Available

### SECTION 2 Hazard(s) identification

#### Classification of the substance or mixture

NFPA 704 diamond



Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health Red = Fire Yellow = Reactivity White = Special (Oxidizer or water reactive substances)

Classification	Flammable Liquids Category 4, Skin Corrosion/Irritation Category 2, Serious Eye Damage/Eye Irritation Category 2A, Specific Target Organ Toxicity - Single Exposure (Respiratory Tract Irritation) Category 3, Reproductive Toxicity Category 1A
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#### Label elements

Hazard pictogram(s)	
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Signal word	Danger
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#### Hazard statement(s)

H227	Combustible liquid.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H360	May damage fertility or the unborn child.

Hazard(s) not otherwise classified  
Not Applicable

Precautionary statement(s) Prevention

P201	Obtain special instructions before use.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves, protective clothing, eye protection and face protection.
P261	Avoid breathing mist/vapours/spray.
P202	Do not handle until all safety precautions have been read and understood.
P264	Wash all exposed external body areas thoroughly after handling.

Precautionary statement(s) Response

P308+P313	IF exposed or concerned: Get medical advice/ attention.
P370+P378	In case of fire: Use water spray/fog to extinguish.
P305+P351+P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER/doctor/physician/first aider/if you feel unwell.
P337+P313	If eye irritation persists: Get medical advice/attention.
P302+P352	IF ON SKIN: Wash with plenty of water.
P304+P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P332+P313	If skin irritation occurs: Get medical advice/attention.
P362+P364	Take off contaminated clothing and wash it before reuse.

Precautionary statement(s) Storage

P403+P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P403+P233	Store in a well-ventilated place. Keep container tightly closed.

Precautionary statement(s) Disposal

P501	Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation.
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No further product hazard information.

SECTION 3 Composition / information on ingredients

Substances

CAS No	%[weight]	Name
872-50-4	100	N-methyl-2-pyrrolidone

Mixtures

See section above for composition of Substances

SECTION 4 First-aid measures

Description of first aid measures

Eye Contact	<p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"><li>▶ Wash out immediately with fresh running water.</li><li>▶ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.</li><li>▶ Seek medical attention without delay; if pain persists or recurs seek medical attention.</li><li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li></ul>
Skin Contact	<p>If skin contact occurs:</p> <ul style="list-style-type: none"><li>▶ Immediately remove all contaminated clothing, including footwear.</li><li>▶ Flush skin and hair with running water (and soap if available).</li><li>▶ Seek medical attention in event of irritation.</li></ul>
Inhalation	<ul style="list-style-type: none"><li>▶ If fumes or combustion products are inhaled remove from contaminated area.</li><li>▶ Lay patient down. Keep warm and rested.</li><li>▶ Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.</li><li>▶ Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.</li><li>▶ Transport to hospital, or doctor, without delay.</li></ul>
Ingestion	<ul style="list-style-type: none"><li>▶ If swallowed do <b>NOT</b> induce vomiting.</li><li>▶ If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.</li><li>▶ Observe the patient carefully.</li></ul>

- ▶ Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious.
- ▶ Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- ▶ Seek medical advice.

**Most important symptoms and effects, both acute and delayed**  
See Section 11

**Indication of any immediate medical attention and special treatment needed**  
Treat symptomatically.

SECTION 5 Fire-fighting measures

- Extinguishing media**
- ▶ Water spray or fog.
  - ▶ Foam.
  - ▶ Dry chemical powder.
  - ▶ BCF (where regulations permit).
  - ▶ Carbon dioxide.

**Special hazards arising from the substrate or mixture**

- |                             |  |
|-----------------------------|--|
| <b>Fire Incompatibility</b> | ▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |
|-----------------------------|--|

**Special protective equipment and precautions for fire-fighters**

<b>Fire Fighting</b>	<ul style="list-style-type: none"><li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li><li>▶ Wear full body protective clothing with breathing apparatus.</li><li>▶ Prevent, by any means available, spillage from entering drains or water course.</li><li>▶ Use water delivered as a fine spray to control fire and cool adjacent area.</li><li>▶ Avoid spraying water onto liquid pools.</li><li>▶ <b>DO NOT</b> approach containers suspected to be hot.</li><li>▶ Cool fire exposed containers with water spray from a protected location.</li><li>▶ If safe to do so, remove containers from path of fire.</li></ul>
<b>Fire/Explosion Hazard</b>	<ul style="list-style-type: none"><li>▶ Combustible.</li><li>▶ Slight fire hazard when exposed to heat or flame.</li><li>▶ Heating may cause expansion or decomposition leading to violent rupture of containers.</li><li>▶ On combustion, may emit toxic fumes of carbon monoxide (CO).</li><li>▶ May emit acrid smoke.</li><li>▶ Mists containing combustible materials may be explosive.</li></ul> Combustion products include: <ul style="list-style-type: none"><li>, carbon dioxide (CO2)</li><li>, nitrogen oxides (NOx)</li><li>, other pyrolysis products typical of burning organic material.</li></ul> May emit poisonous fumes. May emit corrosive fumes.

SECTION 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**  
See section 8

**Environmental precautions**  
See section 12

**Methods and material for containment and cleaning up**

<b>Minor Spills</b>	<ul style="list-style-type: none"><li>▶ Remove all ignition sources.</li><li>▶ Clean up all spills immediately.</li><li>▶ Avoid breathing vapours and contact with skin and eyes.</li><li>▶ Control personal contact with the substance, by using protective equipment.</li><li>▶ Contain and absorb spill with sand, earth, inert material or vermiculite.</li><li>▶ Wipe up.</li><li>▶ Place in a suitable, labelled container for waste disposal.</li></ul>
<b>Major Spills</b>	Moderate hazard. <ul style="list-style-type: none"><li>▶ Clear area of personnel and move upwind.</li><li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li><li>▶ Wear breathing apparatus plus protective gloves.</li><li>▶ Prevent, by any means available, spillage from entering drains or water course.</li><li>▶ No smoking, naked lights or ignition sources.</li><li>▶ Increase ventilation.</li><li>▶ Stop leak if safe to do so.</li><li>▶ Contain spill with sand, earth or vermiculite.</li><li>▶ Collect recoverable product into labelled containers for recycling.</li><li>▶ Absorb remaining product with sand, earth or vermiculite.</li><li>▶ Collect solid residues and seal in labelled drums for disposal.</li><li>▶ Wash area and prevent runoff into drains.</li><li>▶ If contamination of drains or waterways occurs, advise emergency services.</li></ul>

Personal Protective Equipment advice is contained in Section 8 of the SDS.

SECTION 7 Handling and storage

**Precautions for safe handling**

Continued...

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Safe handling	<ul style="list-style-type: none"><li>▶ Avoid all personal contact, including inhalation.</li><li>▶ Wear protective clothing when risk of exposure occurs.</li><li>▶ Use in a well-ventilated area.</li><li>▶ Prevent concentration in hollows and sumps.</li><li>▶ <b>DO NOT enter confined spaces until atmosphere has been checked.</b></li><li>▶ Avoid smoking, naked lights or ignition sources.</li><li>▶ Avoid contact with incompatible materials.</li><li>▶ When handling, <b>DO NOT eat, drink or smoke.</b></li><li>▶ Keep containers securely sealed when not in use.</li><li>▶ Avoid physical damage to containers.</li><li>▶ Always wash hands with soap and water after handling.</li><li>▶ Work clothes should be laundered separately.</li><li>▶ Use good occupational work practice.</li><li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li><li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.</li><li>▶ <b>DO NOT allow clothing wet with material to stay in contact with skin</b></li></ul>
Other information	<p>Consider storage under inert gas.</p> <ul style="list-style-type: none"><li>▶ Material is hygroscopic, i.e. absorbs moisture from the air. Keep containers well sealed in storage.</li><li>▶ Store in original containers.</li><li>▶ Keep containers securely sealed.</li><li>▶ No smoking, naked lights or ignition sources.</li><li>▶ Store in a cool, dry, well-ventilated area.</li><li>▶ Store away from incompatible materials and foodstuff containers.</li><li>▶ Protect containers against physical damage and check regularly for leaks.</li><li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li></ul>

Conditions for safe storage, including any incompatibilities

Suitable container	<ul style="list-style-type: none"><li>▶ Glass container is suitable for laboratory quantities</li><li>▶ Metal can or drum</li><li>▶ Packaging as recommended by manufacturer.</li><li>▶ Check all containers are clearly labelled and free from leaks.</li></ul>
Storage incompatibility	<ul style="list-style-type: none"><li>- For pyrroles:<ul style="list-style-type: none"><li>- Pyrrole is a relatively strong acid because its anion is stabilized by resonance. The negative charge can be successfully delocalized on the ring:</li><li>- Due to its aromatic character, pyrrole is difficult to hydrogenate, does not easily react as a diene in Diels–Alder reactions, and does not undergo usual olefin reactions. Its reactivity is similar to that of benzene and aniline, in that it is easy to alkylate and acylate. Under acidic conditions, pyrroles polymerize easily, and thus many electrophilic reagents that are used in benzene chemistry are not applicable to pyrroles. In contrast, substituted pyrroles (including protected pyrroles) have been used in a broad range of transformations.</li><li>- Pyrroles generally react with electrophiles at the a position (C2 or C5), due to the highest degree of stability of the protonated intermediate. Pyrroles react easily with nitrating (e.g. HNO3/Ac2O), sulfonating (Py·SO3), and halogenating (e.g. NCS, NBS, Br2, SO2Cl2, and KI/H2O2) agents. Halogenation generally provides polyhalogenated pyrroles, but monohalogenation can be performed. As is typical for electrophilic additions to pyrroles, halogenation generally occurs at the 2-position, but can also occur at the 3-position by silylation of the nitrogen. This is a useful method for further functionalization of the generally less reactive 3-position.</li><li>- Acylation generally occurs at the 2-position, through the use of various methods. Acylation with acid anhydrides and acid chlorides can occur without a catalyst; alternatively, a Lewis acid may be used.</li><li>- Pyrroles can undergo reductions to pyrrolidines and to pyrrolines. For example, Birch reduction of pyrrole esters and amides produced pyrrolines, with the regioselectivity depending on the position of the electron-withdrawing group</li></ul></li><li>▶ Avoid reaction with oxidising agents</li></ul>

SECTION 8 Exposure controls / personal protection

Control parameters

Occupational Exposure Limits (OEL)

INGREDIENT DATA

Not Available

Emergency Limits

Ingredient	TEEL-1	TEEL-2	TEEL-3
N-methyl-2-pyrrolidone	30 ppm	32 ppm	190 ppm

Ingredient	Original IDLH	Revised IDLH
N-methyl-2-pyrrolidone	Not Available	Not Available

MATERIAL DATA

for N-methyl-2-pyrrolidone (NMP):  
Reports of skin and eye irritation and chronic headaches have been reported in workers exposed to 1-methyl-2-pyrrolidone. The Australian ES is based on a 10-fold uncertainty factor of the no-observable-adverse-effect level (NOAEL) of 24 ppm where adverse respiratory effects were observed in a 4-week inhalation study in rats. These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.  
CR = Cancer Risk/10000; UF = Uncertainty factor:  
TLV believed to be adequate to protect reproductive health:  
LOD: Limit of detection  
Toxic endpoints have also been identified as:  
D = Developmental; R = Reproductive; TC = Transplacental carcinogen  
Jankovic J., Drake F.: A Screening Method for Occupational Reproductive  
American Industrial Hygiene Association Journal 57: 641-649 (1996)

Exposure controls

Appropriate engineering controls	<p>Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection. The basic types of engineering controls are:</p> <p>Process controls which involve changing the way a job activity or process is done to reduce the risk.</p>
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Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use. Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in special circumstances. If risk of overexposure exists, wear approved respirator. Supplied-air type respirator may be required in special circumstances. Correct fit is essential to ensure adequate protection. Provide adequate ventilation in warehouses and enclosed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25-0.5 m/s (50-100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5-1 m/s (100-200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1-2.5 m/s (200-500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion)	2.5-10 m/s (500-2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range	Upper end of the range
1: Room air currents minimal or favourable to capture	1: Disturbing room air currents
2: Contaminants of low toxicity or of nuisance value only.	2: Contaminants of high toxicity
3: Intermittent, low production.	3: High production, heavy use
4: Large hood or large air mass in motion	4: Small hood-local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

#### Individual protection measures, such as personal protective equipment



#### Eye and face protection

- ▶ Safety glasses with side shields.
- ▶ Chemical goggles. [AS/NZS 1337.1, EN166 or national equivalent]
- ▶ Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

#### Skin protection

See Hand protection below

#### Hands/feet protection

- ▶ Wear chemical protective gloves, e.g. PVC.
  - ▶ Wear safety footwear or safety gumboots, e.g. Rubber
- The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
- The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
- Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
- Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
- frequency and duration of contact,
  - chemical resistance of glove material,
  - glove thickness and
  - dexterity
- Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
  - When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
  - Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
  - Contaminated gloves should be replaced.
- As defined in ASTM F-739-96 in any application, gloves are rated as:
- Excellent when breakthrough time > 480 min
  - Good when breakthrough time > 20 min
  - Fair when breakthrough time < 20 min
  - Poor when glove material degrades
- For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.
- It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.
- Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.
- Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:
- Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.
  - Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential

	Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Body protection	See Other protection below
Other protection	<div><div>▶ Overalls.</div><div>▶ P.V.C apron.</div><div>▶ Barrier cream.</div><div>▶ Skin cleansing cream.</div><div>▶ Eye wash unit.</div></div>

Recommended material(s)

**GLOVE SELECTION INDEX**

Glove selection is based on a modified presentation of the: **"Forsberg Clothing Performance Index"**. The effect(s) of the following substance(s) are taken into account in the **computer-generated** selection:

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Material	CPI
BUTYL	A
PE/EVAL/PE	A
NATURAL RUBBER	B
PVA	B

\* CPI - Chemwatch Performance Index  
A: Best Selection  
B: Satisfactory; may degrade after 4 hours continuous immersion  
C: Poor to Dangerous Choice for other than short term immersion  
**NOTE:** As a series of factors will influence the actual performance of the glove, a final selection must be based on detailed observation. -  
\* Where the glove is to be used on a short term, casual or infrequent basis, factors such as "feel" or convenience (e.g. disposability), may dictate a choice of gloves which might otherwise be unsuitable following long-term or frequent use. A qualified practitioner should be consulted.

Ansell Glove Selection

<b>Glove</b> — <i>In order of recommendation</i>
AlphaTec 02-100
MICROFLEX® 93-260
AlphaTec® 38-612
AlphaTec® 53-001
AlphaTec® 58-005
AlphaTec® Solvex® 37-175
BioClean™ Emerald BENS
BioClean™ Extra BLAS
BioClean™ Fusion (Sterile) S-BFAP
BioClean™ N-Plus BNPS

The suggested gloves for use should be confirmed with the glove supplier.

Respiratory protection

Type AK Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Required minimum protection factor	Maximum gas/vapour concentration present in air p.p.m. (by volume)	Half-face Respirator	Full-Face Respirator
up to 10	1000	AK-AUS / Class1	-
up to 50	1000	-	AK-AUS / Class 1
up to 50	5000	Airline *	-
up to 100	5000	-	AK-2
up to 100	10000	-	AK-3
100+			Airline**

\* - Continuous Flow \*\* - Continuous-flow or positive pressure demand  
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- ▶ The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- ▶ Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

SECTION 9 Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Not Available		
Physical state	Liquid	Relative density (Water = 1)	1.026
Odour	Not Available	Partition coefficient n-octanol / water	Not Available
Odour threshold	Not Available	Auto-ignition temperature (°C)	270
pH (as supplied)	Not Available	Decomposition temperature (°C)	Not Available
Melting point / freezing point (°C)	-24	Viscosity (cSt)	Not Available
Initial boiling point and boiling range (°C)	202	Molecular weight (g/mol)	Not Available
Flash point (°C)	91	Taste	Not Available
Evaporation rate	Not Available	Explosive properties	Not Available
Flammability	Combustible.	Oxidising properties	Not Available
Upper Explosive Limit (%)	9.5	Surface Tension (dyn/cm or mN/m)	Not Available
Lower Explosive Limit (%)	1.3	Volatile Component (%vol)	Not Available
Vapour pressure (kPa)	Not Available	Gas group	Not Available
Solubility in water	Miscible	pH as a solution (1%)	Not Available
Vapour density (Air = 1)	Not Available	VOC g/L	Not Available

## 1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate

Heat of Combustion (kJ/g)	Not Available	Ignition Distance (cm)	Not Available
Flame Height (cm)	Not Available	Flame Duration (s)	Not Available
Enclosed Space Ignition Time Equivalent (s/m3)	Not Available	Enclosed Space Ignition Deflagration Density (g/m3)	Not Available
Nanoform Solubility	Not Available	Nanoform Particle Characteristics	Not Available
Particle Size	Not Available		

## SECTION 10 Stability and reactivity

Reactivity	See section 7
Chemical stability	<ul style="list-style-type: none"> <li>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul>
Possibility of hazardous reactions	See section 7
Conditions to avoid	See section 7
Incompatible materials	See section 7
Hazardous decomposition products	See section 5

## SECTION 11 Toxicological information

## Information on toxicological effects

a) Acute Toxicity	Based on available data, the classification criteria are not met.
b) Skin Irritation/Corrosion	There is sufficient evidence to classify this material as skin corrosive or irritating.
c) Serious Eye Damage/Irritation	There is sufficient evidence to classify this material as eye damaging or irritating
d) Respiratory or Skin sensitisation	Based on available data, the classification criteria are not met.
e) Mutagenicity	Based on available data, the classification criteria are not met.
f) Carcinogenicity	Based on available data, the classification criteria are not met.
g) Reproductivity	There is sufficient evidence to classify this material as toxic to reproductivity
h) STOT - Single Exposure	There is sufficient evidence to classify this material as toxic to specific organs through single exposure
i) STOT - Repeated Exposure	Based on available data, the classification criteria are not met.
j) Aspiration Hazard	Based on available data, the classification criteria are not met.

Inhaled	<p>Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system, in a substantial number of individuals, following inhalation. In contrast to most organs, the lung is able to respond to a chemical insult by first removing or neutralising the irritant and then repairing the damage. The repair process, which initially evolved to protect mammalian lungs from foreign matter and antigens, may however, produce further lung damage resulting in the impairment of gas exchange, the primary function of the lungs. Respiratory tract irritation often results in an inflammatory response involving the recruitment and activation of many cell types, mainly derived from the vascular system.</p> <p>Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.</p> <p>Inhalation of high vapour concentrations of N-methyl-2-pyrrolidone (NMP) may produce mucous membrane irritation, headache, giddiness, mental confusion and nausea. Fatalities were not recorded following inhalation of 180-200 mg/m3 for 2 hours by mice and following a 6 hour exposure to saturated vapours by rats.</p> <p>Laboratory animals exposed to concentrations of 50 ppm for 8 hours daily for 20 days or 370 ppm for 6 hours daily for 10 days showed no gross or histopathological abnormalities</p>
Ingestion	<p>Accidental ingestion of the material may be damaging to the health of the individual.</p> <p>Considered an unlikely route of entry in commercial/industrial environments The liquid may produce considerable gastrointestinal discomfort and may be harmful or toxic if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis</p>
Skin Contact	<p>Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.</p> <p>Prolonged contact with N-methyl-2-pyrrolidone (NMP) reportedly causes severe dermatitis with redness, cracking, swelling, blisters and oedema.</p> <p>An instance of severe skin irritation after a few days work with NMP shows latex rubber gloves as giving insufficient protection. A review article casts doubts on reliability of animal single patch tests, i.e Draize tests. [Irritant Cutaneous Reaction to NMP, Contact Dermatitis 27: 148-150, 1992]</p> <p>Open cuts, abraded or irritated skin should not be exposed to this material</p> <p>Entry into the blood-stream through, for example, cuts, abrasions, puncture wounds or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.</p> <p>Absorption by skin may readily exceed vapour inhalation exposure. Symptoms for skin absorption are the same as for inhalation.</p>
Eye	<p>Direct contact with the liquid N-methyl-2-pyrrolidone (NMP) may produce painful burning or stinging of the eyes and lids, watering and inflammation of the conjunctiva and temporary corneal clouding.</p> <p>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by a temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p>

Continued...



## 1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate

Chronic	Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems. Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic problems. There is sufficient evidence to establish a causal relationship between human exposure to the material and impaired fertility. There is sufficient evidence to establish a causal relationship between human exposure to the material and subsequent developmental toxic effects in the off-spring. The teratogenic potential, subchronic and long term inhalation toxicity of N-methyl-2-pyrrolidone (NMP) has been studied in rats. No evidence of nephrotoxicity was seen. No carcinogenic effects were observed. Very high doses are embryotoxic to rats and mice. Reproductive effects have been reported in animals.	
1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate	TOXICITY	IRRITATION
	Dermal (rabbit) LD50: 8000 mg/kg <sup>[2]</sup>	Eye (Human): 530ppm/30M - Mild
	Inhalation (Rat) LC50: 3.1-8.8 mg/4h <sup>[2]</sup>	Eye (Rodent - rabbit): 0.1mL
	Oral (Rat) LD50: 3914 mg/kg <sup>[2]</sup>	Eye (Rodent - rabbit): 100mg - Moderate
		Eye: adverse effect observed (irritating) <sup>[1]</sup>
		Skin: adverse effect observed (irritating) <sup>[1]</sup>
Legend:	1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances	
1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate	<p>Most people have very few pyrroles in their system at any given time; certain individuals, however, have an unusually high number of pyrroles in their bodies, resulting in a condition known as pyroluria.</p> <p>Pyroluria is becoming more and more prevalent both in children with ADHD and autism and in the general population. It is a little known condition; it was first given the name 'mauve factor'.</p> <p>Pyroluria is a genetically acquired chemical imbalance in which the body produces an abnormally large number of pyrroles. A pyrrole is a chemical that is the by-product of haemoglobin synthesis and have no known function in the body; they are normally excreted in the urine. Pyroluria occurs when the pyrroles bind to pyroxidine (vitamin B6) and zinc, causing these vital nutrients to be excreted from the body in large amounts.</p> <p>Deficiencies of B6 and zinc are associated with a wide range of emotional and psychiatric problems. Vitamin B6 is critical for the production of neurotransmitters and deficiencies can have a profound effect on both mental and physical health. Nervousness, extreme irritability, anxiety, depression, short-term memory problems, and explosive anger have all been linked to Proluria.</p> <p>A large percentage of patients with psychiatric disorders such as schizophrenia exhibit high levels of pyrroles; emotionally dysregulated children and those with an excessive alcohol intake also tend to have an abnormally high pyrrole count.</p> <p>In addition, zinc deficiencies have been associated with a number of physiological disorders, including poor immune function, poor growth, and delayed sexual development. Because zinc and B6 are so important to both our overall physical and mental health, identifying and treating this devastating condition is critical.</p> <p>Included in this condition are changes to fatty acid metabolism which lead to high levels of an omega 6 fatty acid call arachidonic acid. Current research shows that neurological disorders such as ASD as well as psychiatric disorders have a high rate of remission with pyrrole treatment.</p> <p>Pyrrole Disorder can also be triggered by a traumatic event and high stress levels and is also often part of the picture for PDD, ODD, Tics, Tourette s Syndrome, Depression, and Bipolar Disorder.</p> <p>Treatment of Pyroluria consists of a replacement of zinc and vitamin B6. Because the treatment is replacing deficiencies not pharmacologic, it needs to be titrated to individual requirements.</p> <p>Common symptoms associated with Pyrrole Disorder in children (may not include all symptoms):</p> <ul style="list-style-type: none"><li>· Sleep problems, particularly taking a long time to fall asleep and waking up easily at night</li><li>· Sensory sensitivity i.e. to the labels on clothes, to specific fabrics – e.g. 'feels prickly', to noises.</li><li>· Anxiety. (Anxiety can contribute to digestive upsets such as IBS)</li><li>· Poor tolerance of stress</li><li>· Depression, pessimistic outlook, mood swings, emotional lability</li><li>· Anger and violence out of proportion to the situation, including rage</li><li>· Poor functioning of the digestive system, including poor absorption of nutrients as well as food sensitivities</li><li>· Low immunity – constantly suffering with coughs and colds</li><li>· Motion sickness</li><li>· Reading and learning problems</li><li>· Poor memory</li><li>· Slow growth</li><li>· Delayed puberty</li><li>· Unpleasant body odour</li><li>· Stretch marks on skin</li><li>· Pain in joints and extremities</li><li>· Sweet fruity breath and body odour, problems with sugar metabolism, allergies</li></ul>	
N-METHYL-2-PYRROLIDONE	<p>A substance (or part of a group of chemical substances) of very high concern (SVHC) - or product containing an SVHC:</p> <p>It is proposed that use within the European Union be subject to authorisation under the REACH Regulation.Indeed, listing of a substance as an SVHC by the European Chemicals Agency (ECHA) is the first step in the procedure for authorisation or restriction of use of a chemical. The criteria are given in article 57 of the REACH Regulation. A substance may be proposed as an SVHC if it meets one or more of the following criteria:</p> <ul style="list-style-type: none"><li>▶ it is carcinogenic *;</li><li>▶ it is mutagenic *;</li><li>▶ it is toxic for reproduction *;</li><li>▶ it is persistent, bioaccumulative and toxic (PBT substances);</li><li>▶ it is very persistent and very bioaccumulative (vPvB substances);</li><li>▶ there is "scientific evidence of probable serious effects to human health or the environment which give rise to an equivalent level of concern"; such substances are identified on a case-by-case basis.</li></ul> <p>* Collectively described as CMR substances</p> <p>The "equivalent concern" criterion is significant because it is this classification which allows substances which are, for example, neurotoxic, endocrine-disrupting or otherwise present an unanticipated environmental health risk to be regulated under REACH]</p> <p>Simply because a substance meets one or more of the criteria does not necessarily mean that it will be proposed as an SVHC. Many such substances are already subject to restrictions on their use within the European Union, such as those in Annex XVII of the REACH Regulation. SVHCs are substances for which the current restrictions on use (where these exist) might be insufficient. There are three priority groups for assessment:</p> <ul style="list-style-type: none"><li>▶ PBT substances and vPvB substances;</li><li>▶ substances which are widely dispersed during use;</li><li>▶ substances which are used in large quantities.</li></ul>	
1-methyl-2-pyrrolidone (NMP), GC Headspace,	Asthma-like symptoms may continue for months or even years after exposure to the material ends. This may be due to a non-allergic condition known as reactive airways dysfunction syndrome (RADS) which can occur after exposure to high levels of highly irritating compound. Main criteria for diagnosing RADS include the absence of previous airways disease in a non-atopic individual, with sudden onset	



## 1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate

## Veritas Ultimate &amp; N-METHYL-2-PYRROLIDONE

of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. Other criteria for diagnosis of RADS include a reversible airflow pattern on lung function tests, moderate to severe bronchial hyperreactivity on methacholine challenge testing, and the lack of minimal lymphocytic inflammation, without eosinophilia. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. On the other hand, industrial bronchitis is a disorder that occurs as a result of exposure due to high concentrations of irritating substance (often particles) and is completely reversible after exposure ceases. The disorder is characterized by difficulty breathing, cough and mucus production.

for N-methyl-2-pyrrolidone (NMP):

**Acute toxicity:** In rats, NMP is absorbed rapidly after inhalation, oral, and dermal administration, distributed throughout the organism, and eliminated mainly by hydroxylation to polar compounds, which are excreted via urine. About 80% of the administered dose is excreted as NMP and NMP metabolites within 24 h. A probably dose-dependent yellow coloration of the urine in rodents is observed. The major metabolite is 5-hydroxy-N-methyl-2-pyrrolidone.

Studies in humans show comparable results. Dermal penetration through human skin has been shown to be very rapid. NMP is rapidly biotransformed by hydroxylation to 5-hydroxy-N-methyl-2-pyrrolidone, which is further oxidized to N-methylsuccinimide; this intermediate is further hydroxylated to 2-hydroxy-N-methylsuccinimide. These metabolites are all colourless. The excreted amounts of NMP metabolites in the urine after inhalation or oral intake represented about 100% and 65% of the administered doses, respectively.

NMP has a low potential for skin irritation and a moderate potential for eye irritation in rabbits. Repeated daily doses of 450 mg/kg body weight administered to the skin caused painful and severe haemorrhage and eschar formation in rabbits. These adverse effects have not been seen in workers occupationally exposed to pure NMP, but they have been observed after dermal exposure to NMP used in cleaning processes. No sensitisation potential has been observed.

In acute toxicity studies in rodents, NMP showed low toxicity. Uptake of oral, dermal, or inhaled acutely toxic doses causes functional disturbances and depressions in the central nervous system. Local irritation effects were observed in the respiratory tract when NMP was inhaled and in the pyloric and gastrointestinal tracts after oral administration. In humans, there was no irritative effect in the respiratory system after an 8-h exposure to 50 mg/m<sup>3</sup>.

**Repeat dose toxicity:** There is no clear toxicity profile of NMP after multiple administration. In a 28-day dietary study in rats, a compound-related decrease in body weight gain was observed in males at 1234 mg/kg body weight and in females at 2268 mg/kg body weight. Testicular degeneration and atrophy in males and thymic atrophy in females were observed at these dose levels. The no-observed-adverse-effect level (NOAEL) was 429 mg/kg body weight in males and 1548 mg/kg body weight in females. In a 28-day intubation study in rats, a dose-dependent increase in relative liver and kidney weights and a decrease in lymphocyte count in both sexes were observed at 1028 mg/kg body weight. The NOAEL in this study was 514 mg/kg body weight. In another rat study, daily dietary intake for 90 days caused decreased body weights at doses of 433 and 565 mg/kg body weight in males and females, respectively. There were also neurobehavioural effects at these dose levels. The NOAELs in males and females were 169 and 217 mg/kg body weight, respectively.

The toxicity profile after exposure to airborne NMP depends strongly on the ratio of vapour to aerosol and on the area of exposure (i.e., head-only or whole-body exposure). Because of higher skin absorption for the aerosol, uptake is higher in animals exposed to aerosol than in those exposed to vapour at similar concentrations. Studies in female rats exposed head only to 1000 mg/m<sup>3</sup> showed only minor nasal irritation, but massive mortality and severe effects on major organs were observed when the females were whole-body exposed to the same concentration of coarse droplets at high relative humidity. Several studies in rats following repeated exposure to NMP at concentrations between 100 and 1000 mg/m<sup>3</sup> have shown systemic toxicity effects at the lower dose levels. In most of the studies, the effects were not observed after a 4-week observation period.

In rats, exposure to 3000 mg NMP/m<sup>3</sup> (head only) for 6 h/day, 5 days/week, for 13 weeks caused a decrease in body weight gain, an increase in erythrocytes, haemoglobin, haematocrit, and mean corpuscular volume, decreased absolute testis weight, and cell loss in the germinal epithelium of the testes. The NOAEL was 500 mg/m<sup>3</sup>.

There are no data in humans after repeated-dose exposure.

**Carcinogenicity:** NMP did not show any clear evidence for carcinogenicity in rats exposed to concentrations up to 400 mg/m<sup>3</sup> in a long-term inhalation study.

**Genotoxicity:** The mutagenic potential of NMP is weak. Only a slight increase in the number of revertants was observed when tested in a *Salmonella* assay with base-pair substitution strains. NMP has been shown to induce aneuploidy in yeast *Saccharomyces cerevisiae* cells. No investigations regarding mutagenicity in humans were available.

**Reproductive toxicity:** In a two-generation reproduction study in rats, whole-body exposure of both males and females to 478 mg/m<sup>3</sup> of NMP vapour for 6 h/day, 7 days/week, for a minimum of 100 days (pre-mating, mating, gestation, and lactation periods) resulted in a 7% decrease in fetal weight in the F1 offspring. A 4-11% transient, non-dose-dependent decrease was observed in the average pup weight at all exposure levels tested (41, 206, and 478 mg/m<sup>3</sup>).

**Developmental toxicity:** When NMP was administered dermally, developmental toxicity was registered in rats at 750 mg/kg body weight. The observed effects were increased preimplantation losses, decreased fetal weights, and delayed ossification. The NOAEL for both developmental effects and maternal toxicity (decreased body weight gain) was 237 mg/kg body weight.

Inhalation studies in rats (whole-body exposure) demonstrated developmental toxicity as increased preimplantation loss without significant effect on implantation rate or number of live fetuses at 680 mg/m<sup>3</sup> and behavioural developmental toxicity at 622 mg/m<sup>3</sup>. In an inhalation study (whole-body exposure), the NOAEL for maternal effects was 100 mg/m<sup>3</sup>, and the NOAEL for developmental effects was 360 mg/m<sup>3</sup>.

A tolerable inhalation concentration, 0.3 mg/m<sup>3</sup>, based on mortality and organ damage, is expected to be protective against any possible reproductive toxicity. Similarly, an oral tolerable intake of 0.6 mg/kg body weight per day, based on a 90-day study, is expected to provide adequate protection against possible reproductive effects. Because of non-existent data on the exposure of the general population and very limited information on occupational exposure, no meaningful risk characterisation can be performed

Acute Toxicity	✗	Carcinogenicity	✗
Skin Irritation/Corrosion	✓	Reproductivity	✓
Serious Eye Damage/Irritation	✓	STOT - Single Exposure	✓
Respiratory or Skin sensitisation	✗	STOT - Repeated Exposure	✗
Mutagenicity	✗	Aspiration Hazard	✗

**Legend:** ✗ – Data either not available or does not fill the criteria for classification  
 ✓ – Data available to make classification

## SECTION 12 Ecological information

## Toxicity

1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate	Endpoint	Test Duration (hr)	Species	Value	Source
	EC50	72h	Algae or other aquatic plants	>500mg/l	1
	EC50	48h	Crustacea	ca.4897mg/l	1
	NOEC(ECx)	504h	Crustacea	12.5mg/l	2
	LC50	96h	Fish	464mg/l	1
<b>Legend:</b> Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. Vendor Data					

Continued...

for N-methyl-2-pyrrolidinone (NMP):  
log Kow : -0.44-0.1

**Environmental Fate**  
NMP may enter the environment as emissions to the atmosphere, as the substance is volatile and widely used as a solvent, or it may be released to water as a component of municipal and industrial wastewaters. The substance is mobile in soil, and leaching from landfills is thus a possible route of contamination of groundwater. In air, NMP is expected to be removed by wet deposition or by photochemical reactions with hydroxyl radicals. As the substance is completely miscible in water, it is not expected to adsorb to soil, sediments, or suspended organic matter or to bioconcentrate. NMP is not degraded by chemical hydrolysis. Data from screening tests on the biodegradability of NMP show that the substance is rapidly biodegraded. This material is not expected to persist in the environment. It is water soluble and is expected to have low volatility. Hydrolysis is not expected to be an important factor in the environmental fate process for this material.

**Persistence and Degradability**  
Biodegradation: BOD (Modified MITI Method) = 73% (28 days). BOD (Modified MITI Method) = 92% (14 days). This material is expected to be readily biodegradable. Bioaccumulation: BCF = 0.16. This material is not expected to bioaccumulate

**Ecotoxicity**  
This material is expected to be non-hazardous to aquatic species.  
Fish LC50 (96 h): bluegill. 832 mg/l, fathead minnow 1072 mg/l; rainbow trout 3048 mg/l  
Daphnia magna EC50 (24 h): > 1000 mg/l  
Algae EC50 (72 h): Scenedesmus subspicatus > 500 mg/l

DO NOT discharge into sewer or waterways.

Persistence and degradability

Ingredient	Persistence: Water/Soil	Persistence: Air
N-methyl-2-pyrrolidone	LOW	LOW

Bioaccumulative potential

Ingredient	Bioaccumulation
N-methyl-2-pyrrolidone	LOW (BCF = 0.16)

Mobility in soil

Ingredient	Mobility
N-methyl-2-pyrrolidone	LOW (Log KOC = 20.94)

Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

SECTION 13 Disposal considerations

Waste treatment methods

Product / Packaging disposal	<ul style="list-style-type: none"><li>Containers may still present a chemical hazard/ danger when empty.</li><li>Return to supplier for reuse/ recycling if possible.</li></ul> Otherwise: <ul style="list-style-type: none"><li>If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.</li><li>Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li></ul> Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. A Hierarchy of Controls seems to be common - the user should investigate: <ul style="list-style-type: none"><li>Reduction</li><li>Reuse</li><li>Recycling</li><li>Disposal (if all else fails)</li></ul> This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate. <ul style="list-style-type: none"><li>DO NOT allow wash water from cleaning or process equipment to enter drains.</li><li>It may be necessary to collect all wash water for treatment before disposal.</li><li>In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li><li>Where in doubt contact the responsible authority.</li><li>Recycle wherever possible or consult manufacturer for recycling options.</li><li>Consult State Land Waste Authority for disposal.</li><li>Bury or incinerate residue at an approved site.</li><li>Recycle containers if possible, or dispose of in an authorised landfill.</li></ul>
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SECTION 14 Transport information

Labels Required

Marine Pollutant	NO
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Land transport (DOT): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Air transport (ICAO-IATA / DGR): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

Sea transport (IMDG-Code / GGVSee): NOT REGULATED FOR TRANSPORT OF DANGEROUS GOODS

14.7. Maritime transport in bulk according to IMO instruments

14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code

Product name	Pollution Category	Ship Type
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N-Methyl-2-pyrrolidone	Y	3
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14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code

Product name	Group
N-methyl-2-pyrrolidone	Not Available

14.7.3. Transport in bulk in accordance with the IGC Code

Product name	Ship Type
N-methyl-2-pyrrolidone	Not Available

SECTION 15 Regulatory information

Safety, health and environmental regulations / legislation specific for the substance or mixture

N-methyl-2-pyrrolidone is found on the following regulatory lists
Chemical Footprint Project - Chemicals of High Concern List
US - California Proposition 65 - Maximum Allowable Dose Levels (MADLs) for Chemicals Causing Reproductive Toxicity
US - California Proposition 65 - Reproductive Toxicity
US - California Safe Drinking Water and Toxic Enforcement Act of 1986 - Proposition 65 List
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know Hazardous Substances
US - Pennsylvania - Hazardous Substance List
US AIHA Workplace Environmental Exposure Levels (WEELs)
US DOE Temporary Emergency Exposure Limits (TEELs)
US EPCRA Section 313 Chemical List
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US Toxicology Excellence for Risk Assessment (TERA) Workplace Environmental Exposure Levels (WEEL)
US TSCA Section 12(b) - List of Chemical Substances Subject to Export Notification Requirements
US TSCA Section 4/12 (b) - Sunset Dates/Status

Additional Regulatory Information

Not Applicable

Federal Regulations

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Section 311/312 hazard categories	
Flammable (Gases, Aerosols, Liquids, or Solids)	Yes
Gas under pressure	No
Explosive	No
Self-heating	No
Pyrophoric (Liquid or Solid)	No
Pyrophoric Gas	No
Corrosive to metal	No
Oxidizer (Liquid, Solid or Gas)	No
Organic Peroxide	No
Self-reactive	No
In contact with water emits flammable gas	No
Combustible Dust	No
Carcinogenicity	No
Acute toxicity (any route of exposure)	No
Reproductive toxicity	Yes
Skin Corrosion or Irritation	Yes
Respiratory or Skin Sensitization	No
Serious eye damage or eye irritation	Yes
Specific target organ toxicity (single or repeated exposure)	No
Aspiration Hazard	No
Germ cell mutagenicity	No
Simple Asphyxiant	No
Hazards Not Otherwise Classified	No

US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)

None Reported

US. EPCRA Section 313 Toxic Release Inventory (TRI) (40 CFR 372)

This product contains the following EPCRA section 313 chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know-Act of 1986 (40 CFR 372):

CAS No	%[weight]	Name
872-50-4	100	N-methyl-2-pyrrolidone

This information must be included in all SDSs that are copied and distributed for this material.

Additional Federal Regulatory Information

Not Applicable

State Regulations

US. California Proposition 65

**WARNING:** This product can expose you to chemicals including **N-methyl-2-pyrrolidone**, which is known to the State of California to cause birth defects or other reproductive harm. For more information, go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov)

Not Applicable

National Inventory Status

National Inventory	Status
Australia - AIIC / Australia Non-Industrial Use	Yes
Canada - DSL	Yes
Canada - NDSL	No (N-methyl-2-pyrrolidone)
China - IECSC	Yes
Europe - EINEC / ELINCS / NLP	Yes
Japan - ENCS	Yes
Korea - KECI	Yes
New Zealand - NZIoC	Yes
Philippines - PICCS	Yes
USA - TSCA	All chemical substances in this product have been designated as TSCA Inventory 'Active'
Taiwan - TCSI	Yes
Mexico - INSQ	Yes
Vietnam - NCI	Yes
Russia - FBEPH	Yes
UAE - Control List (Banned/Restricted Substances)	No (N-methyl-2-pyrrolidone)
Legend:	Yes = All CAS declared ingredients are on the inventory No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration.

SECTION 16 Other information

Revision Date	15/08/2025
Initial Date	28/07/2025

SDS Version Summary

Version	Date of Update	Sections Updated
4.5	15/08/2025	Hazards identification - Classification

Other information

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Definitions and abbreviations

- PC - TWA: Permissible Concentration-Time Weighted Average
- PC - STEL: Permissible Concentration-Short Term Exposure Limit
- IARC: International Agency for Research on Cancer
- ACGIH: American Conference of Governmental Industrial Hygienists
- STEL: Short Term Exposure Limit
- TEEL: Temporary Emergency Exposure Limit,
- IDLH: Immediately Dangerous to Life or Health Concentrations
- ES: Exposure Standard
- OSF: Odour Safety Factor
- NOAEL: No Observed Adverse Effect Level
- LOAEL: Lowest Observed Adverse Effect Level
- TLV: Threshold Limit Value
- LOD: Limit Of Detection
- OTV: Odour Threshold Value
- BCF: BioConcentration Factors
- BEI: Biological Exposure Index
- DNEL: Derived No-Effect Level
- PNEC: Predicted no-effect concentration
- MARPOL: International Convention for the Prevention of Pollution from Ships

**1-methyl-2-pyrrolidone (NMP), GC Headspace, Veritas Ultimate**

- ▶ IMSBC: International Maritime Solid Bulk Cargoes Code
- ▶ IGC: International Gas Carrier Code
- ▶ IBC: International Bulk Chemical Code
  
- ▶ AIIC: Australian Inventory of Industrial Chemicals
- ▶ DSL: Domestic Substances List
- ▶ NDSL: Non-Domestic Substances List
- ▶ IECSC: Inventory of Existing Chemical Substance in China
- ▶ EINECS: European INventory of Existing Commercial chemical Substances
- ▶ ELINCS: European List of Notified Chemical Substances
- ▶ NLP: No-Longer Polymers
- ▶ ENCS: Existing and New Chemical Substances Inventory
- ▶ KECI: Korea Existing Chemicals Inventory
- ▶ NZIoC: New Zealand Inventory of Chemicals
- ▶ PICCS: Philippine Inventory of Chemicals and Chemical Substances
- ▶ TSCA: Toxic Substances Control Act
- ▶ TCSI: Taiwan Chemical Substance Inventory
- ▶ INSQ: Inventario Nacional de Sustancias Químicas
- ▶ NCI: National Chemical Inventory
- ▶ FBEPH: Russian Register of Potentially Hazardous Chemical and Biological Substances

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