

## Safety Data Sheet

### 1. Product and company identification

Product name : N-Methyl-2-pyrrolidinone  
Name of manufacturer : KANTO CHEMICAL CO., INC.  
Address : 2-1, Nihonbashi, Muromachi 2-Chome, Chuo-Ku, Tokyo, 103-0022, Japan  
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SDS No. : GE00039

### 2. Summary of danger and Hazard

#### GHS classification

##### Physical and chemical hazard

Flammable liquids : Out of category

Pyrophoric liquids : Out of category

##### Human health hazard

Acute toxicity(oral) : Out of category

Acute toxicity(dermal)

: Out of category

Acute toxicity(inhalation:dust, mists)

: Out of category

##### Skin corrosion • Irritation

: Category 2

Serious eye damage • Eye irritation

: Category 2A

##### Reproductive toxicity

: Category 1B

Specific target organ systemic toxicity(single exposure)

: Category 3 (anesthetic action)

Specific target organ systemic toxicity(repeated exposure)

: Category 2

##### Environmental hazard

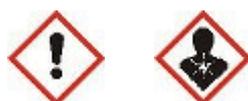
Hazardous to the aquatic environment-acute hazard

: Out of category

Hazardous to the aquatic environment-chronic hazard

: Out of category

#### Pictogram or symbol



Signal word : Danger

Hazard statement : Causes skin irritation  
Causes serious eye irritation  
May damage fertility or the unborn child  
May cause drowsiness and dizziness  
May cause damage to organs (nervous system, lung, liver, born marrow) through prolonged or repeated exposure

Cautions

Safety measurements : Do not handle until all safety precautions have been read and understood.  
Do not breathe dust, mist, and vapor.  
Use only in a well-ventilated area.  
Wear appropriate protective gloves, glasses, clothing, face shield, or mask.  
Wash protective equipment thoroughly after use.

First-aid measures : If inhaled : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical treatment if you feel unwell.

If in eyes : Rinse cautiously with water for several minutes. Get medical treatment.

If on skin : Remove contaminated clothing and the substance. Get medical treatment, if you feel unwell.

Wash hands thoroughly after handling.

If exposed or concerned, get medical treatment.

Get medical treatment, if you feel unwell.

Storage : Tightly container closed and store in a well-ventilated area.

Store locked up.

Disposal : Dispose of contents and containers appropriately in accordance with related regulations.

3. Composition/Information on ingredients

Substance/Mixture : Substance

Chemical name or commercial name

: N-Methyl-2-pyrrolidinone

Synonyms : N-Methyl-2-pyrrolidone, NMP

Ingredients and composition

: N-Methyl-2-pyrrolidinone min. 99.5%

Chemical formula : CH<sub>3</sub>NC<sub>4</sub>H<sub>6</sub>O

CAS No. : 872-50-4

TSCA Inventory : Registered

EINECS No. : 2128281

4. First aid measures

Inhalation : Remove the victim to fresh air, and make him blow his nose and gargle.

Skin contact : Wash the affected areas under running water.

- Eye contact : Wash the affected areas under running water for at least 15 minutes. If necessary, get medical treatment.
- Ingestion : Rinse mouth with water. Give the victim one or two glasses of water or milk, do not induce vomiting. Get medical treatment as soon as possible.

Protection for first aid person

- : Savers wear proper protective equipment like rubber gloves, goggles.

5. Fire fighting measures

- Extinguishing media : Water, dry chemical powder, carbon dioxide, dry sand

Prohibited extinguishing media

- : None

- Particular fire fighting : Move containers from fire area if it can be done without risk, if not possible, apply water from a safe distance to cool and protect surrounding area.

Dry chemical powder, carbon dioxide or dry sand should be used for small fires. Foam extinguisher is effective for a large scale fire.

Protection for firefighters

- : Wear breathing apparatus.

6. Accidental release measures

- Cautions for personnel : Wear proper equipment and avoid contact with skin and inhalation of vapor. Keep personnel removed from and upwind of fire. Shut off all sources of ignition. Keep away personnel except for authorized ones from spillage area by stretching ropes.

- Cautions for environment : Attention should be given not to cause damage to the environment by flowing of spillage to rivers. In case of the dilution of copious water, do not cause damage to the environment by untreated wastewater.

- Removal measure : Absorb spill with inert material (e.g., diatomaceous earth, sand) and flush residual area with copious amounts of water.

Prevention of second accident

- : Remove nearby sources of ignition and prepare extinguishing media.

7. Cautions of handling and storage

Handling

- Engineering measures : Wear proper equipment not to contact with skin or inhale the vapor. Fire is strictly prohibited.  
Ventilate well at working places.

Cautions for safety handling

- : Use with an enclosed system or a local exhaust ventilation.

- Cautions : Do not contact with oxidizing substances.

Storage

Adequate storage condition

- : Store the bottle tightly closed in a cool, dark place because the substance has hygroscopic property.

Safety adequate container materials

- : Glass, fluorine resin, stainless steel  
Do not use polyvinyl chloride resin, polystyrene.

8. Exposure control/Personal protection

Engineering measures : Use only with adequate ventilation and in closed systems.

Control parameters

ACGIH(2009) : Not established

Protective equipment

Respiration protective equipment

: Chemical cartridge respirator with an organic vapor cartage or airline respirator

Hands protective equipment

: Impervious protective gloves

Eyes protective equipment

: Safety goggles

Skin and body protective equipment

: Protective clothing, protective boots

9. Physical and chemical properties

Appearance : Liquid

Color : Colorless-pale yellow

Odor : Slight amine odor

Boiling point : 202°C

Melting point : -24.4°C

Flash point : 95°C

Auto-ignition point : 346°C

Explosion characteristics

Explosion limit : upper : 3.9vol% lower : 0.9vol%

Vapor pressure : 0.32hPa(20°C)

Vapor density : 3.4

Specific gravity : 1.027g/cm<sup>3</sup> (25°C)

Solubility

Solubility in solvents : Water ; Freely soluble

Organic solvents ; Readily soluble in ethanol, chloroform, diethylether etc.

log Pow : -0.54

Other data : Viscosity : 1.65cP(25°C)

10. Stability and reactivity

Stability : Stable under normal usage.

Reactivity : May react with oxidizing substances.

Incompatible conditions : Light, heat

Incompatible materials : Oxidizing substances

Hazardous decomposition products

: Carbon monoxide, nitrogen oxides

11. Toxicological information

- Acute toxicity : Oral : Out of category  
Dermal : Out of category  
Inhalation(vapor) : Not possible to classify because of insufficient data.  
Inhalation(dust, mist) : Out of category  
In rats that underwent head-only inhalation exposure (4 hours), mortality was not observed at 5.1mg/L. Based on the saturated vapour pressure concentration of approximately 1.7mg/L, the tests were thought to be conducted under the mist state. Thus, the substance was classified into out of category.  
rat oral LD50=3500mg/kg  
rabbit skin LD50=6000mg/kg
- Skin corrosiveness : Causes skin irritation(category 2)  
There was a description that in humans (n=50) who repeatedly received 24-hour patch tests on scratched skin for 15 times, slight to moderate temporary irritation was induced, and similarly, the substance caused skin irritation and contact dermatitis in humans. In rabbit Draize tests, slight erythema (Draize score=0.5 equivalent to Not classified) was observed and in topical tests in which guinea pigs were treated with an aqueous solution containing the substance, slight erythema (shown in 2 out of 10 treated guinea pigs) was observed only at 50% solution. However, application of the substance to the skin of rabbits for 5 to 15 minutes caused severe erythema. Taking the skin irritation potential to humans into account, it was classified into category 2.
- Irritation to skin, eyes : Causes serious eye irritation(category 2A)  
The substance has been documented to have effects on humans in such forms as severe eye irritation and chronic eye irritation. In Draize tests on rabbits, corneal clouding, iritis, and conjunctivitis were observed, and these symptoms disappeared within 21 days. Also, in another test using rabbits, corneal clouding, redness, and swelling were observed, and these symptoms continued after 8 days. Furthermore, in other rabbit tests, the substance was documented to cause moderate eye irritation. Based on these effects observed in animals and humans, it was classified into category 2A.
- Respiratory sensitization or Skin sensitization : Respiratory sensitization : Not possible to classify because of insufficient data.  
Skin sensitization : Not possible to classify because of insufficient data.  
50 humans, who repeatedly received 24-hour patch tests on scratched skin 15 times, showed no signs of contact sensitization. Similarly, the substance was documented to be not sensitizing in human path tests. In addition, in the tests using guinea pigs, sensitization was not observed 24 and 48 hours after the application. Based on the final evaluation that the substance is not sensitizing to the skin of humans and animals, it was set into out of category.
- Mutagenicity : Not possible to classify because of insufficient data.
- Carcinogenic effects : Not possible to classify because of insufficient data

There is the description that in 2-year inhalation tests using rats, no development of tumors was observed at the high doses tested. Similarly, in the tests in which mice underwent subcutaneous injections for 17 months, there was no difference in the rates of developing cancer between treated and untreated mice. However, since both inhalation route (rats) and oral route tests (mice) included only one animal species as a test subject, it was not possible to classify.

#### Effects on the reproductive system

: May damage fertility or the unborn child(category 1B)

In oral route tests using rats, the following effects were observed: decreased body weight of maternal animals, decreased survival rates and growth rates of the offspring, reduced sizes of testes and ovaries, malformation of organs and skeletons, and cryptorchism. In addition, in the dermal route tests using rats, the following effects were observed: decreased body weight gain of maternal animals, increased resorption of embryos, skeletal abnormalities (lack of sternebra, fusion and split of ribs, supernumerary ribs, dysraphism of skull, failed ossification of vertebrae, fusion of cervical atlas and occipital bones, and reduction or incomplete hyoid bones). In contrast, in dermal route tests using rabbits, symptoms of maternal toxicity were not observed and only mild toxicity to fetuses (skeletal mutation: development of accessory ribs) was observed.

#### Specific target organ systemic toxicity single exposure

: May cause drowsiness and dizziness(category 3)

Since the substance is documented to cause severe eye irritation and headaches in humans, it cannot be classified for specific organs or systemic toxicity. In 4-hour inhalation tests using rats, fast and irregular breathing, breathlessness, suppression of pain reflex, and bloody nasal secretion were detected. After the exposure, polypnea and slight blood trace on perinasal hair were observed. In addition, in 2-hour inhalation tests using mice, the substance was documented to cause irritation of the eyes and upper airways. Based on these results, it was classified into category 3 (respiratory tract irritation).

#### Specific target organ systemic toxicity repeated exposure

: May cause damage to organs (nervous system, lung, liver, bone marrow) through prolonged or repeated exposure(category 2)

2-week inhalation test using rats (assuming that the substance was in vapour state based on the administration dose of 1.0mg/L), 90-day conversion value of approx. 0.16mg/L (equivalent to category 1 guidance values), was associated with reduction and necrosis of the bone marrow cells and the spleen (lymphocytes), necrosis of the liver, multifocal purulent pneumonia, ulceration of glandular stomach, and increased weight of adrenal glands. Altered lung and kidney were observed at a dose within category 1 by 5-month inhalation test (it was vapor because of administration dose of 0.1-0.15mg/L), so it was set to category 1 (bone marrow, spleen, liver, respiratory organs, adrenal gland, kidney). Moreover, in 5-month inhalation tests (assuming that the substance was in vapour state based on the administration dose of 0.1-0.15mg/L), changes in the lung and kidney were observed at the dose equivalent to the category 1 guidance values. Thus, the substance was classified into category 1 (bone marrow, spleen, liver, respiratory system, adrenal gland, and kidney) for inhalation route only.



In addition, 4-week repeated inhalation toxicity test in rats (high dose exposure stop after 10 days since the large number of death was observed), died, dying due to slaughter (13/30), lethargy, irregular breathing, difficulty breathing, death/dying animals with edema, congestion of the lungs, and bone marrow hypoplasia, thymus, spleen, atrophy and necrosis of the lymphoid tissue of the lymph nodes were observed at 1,000mg/m<sup>3</sup> (corresponding guidance value:0.11mg/L). Highest value of Vapor phase concentration at room temperature, at dry air (0% relative humidity) is 1,318mg/m<sup>3</sup>, at usual humidity (relative humidity of 60%) is the 412mg/m<sup>3</sup>, and at moist air (100% relative humidity) is 0mg/m<sup>3</sup>. Thus, there is considered that above 1,000mg/m<sup>3</sup> is contained mist rather than the vapor. Since applying the classification of the Category of the mist, it was classified into category 2(nervous system, lung, liver, born marrow).

Aspiration hazard : Not possible to classify because of insufficient data.

12. Ecological information

Ecotoxicity

Fish toxicity : Acute aquatic toxicity : Out of category  
 Chronic aquatic toxicity : Out of category  
 Daphnia magna EC50>1000mg/L/24H

Rediualbility and degradability

: High biodegradability

Ecorediualbility

: Not available

13. Disposal consideration

Residual disposal : Burn in a chemical incinerator equipped with an afterburner and a scrubber. Or entrust approved waste disposal companies with the disposal.

Containers

: In case of disposal of empty bottles, dispose bottles after removing the content thoroughly.

14. Transport information

UN class

: It is not regulated under UN regulations.

15. Regulatory information

Ensure this material in compliance with federal requirements and ensure conformity to local regulations.

16. Other information

References

Dictionary of Organic Compounds, The society of Synthetic Organic Chemistry, Kodansha Ltd. (1985)  
 Solvents Handbook, T, Asahara et al, Kodansha Scientific Ltd. (1976)  
 Dangerous Properties of Industrial Materials, 6th ed. N. I. Sax Van Nostrand Reinhold Company (1984)  
 Handbook of 15710 Chemical Products, The Chemical Daily Co. (2010)

The information contained herein is based on several references and the present state of our knowledge. However the SDS does not always cover all information about the product, handle the product carefully. The information is intended to ordinary usage, in case of particular handlings, conduct appropriate safety measurements. The information herein is only provision of information, and it does not represent a guarantee the properties of the product. The Safety Data Sheet (SDS) is prepared based on JIS Z7253, and it has the same required elements on the Material Safety Data Sheet (MSDS) which is prepared based on JIS Z7250:2010.