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Safety Data Sheet

Section 1. Identification of the substance/mixture and of the company/undertaking

Product identifier:
Product name: N-Methylmorpholine(4-)
SDS No. : 5002E-2
Relevant identified uses of the substance or mixture and uses advised against
Research and Development
Details of the supplier of the safety data sheet
Manufacturer/Supplier: KISHIDA CHEMICAL CO., LTD.
Address: 3-1, Honmachibashi, Chuo-ku, Osaka, JAPAN
Division: Chemical Safety Management Department
Telephone number: +81-6-6946-8061
FAX: +81-6-6946-1607

Section 2. Hazards identification

GHS classification and label elements of the product
Classification of the substance or mixture
PHYSICAL AND CHEMICAL HAZARDS
Flammable liquids: Category 2
HEALTH HAZARDS
Acute toxicity (Dermal): Category 4
(Note) GHS classification without description: Not classified/Classification not possible
Label elements

Signal word: Danger
HAZARD STATEMENT
H225 Highly flammable liquid and vapor
H312 Harmful in contact with skin
PRECAUTIONARY STATEMENT
Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof electrical/ventilating/lighting equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
Response
P370 + P378 In case of fire: Use appropriate media to extinguish.
P312 Call a POISON CENTER/doctor/physician if you feel unwell.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing.

Rinse skin with water or shower.
P362 + P364 Take off contaminated clothing and wash it before reuse.

Storage

P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal

P501 Dispose of contents/container in accordance with local/national regulation.

Specific adverse human health effects

See "11. Toxicological Information".

Section 3. Composition/information on ingredients

Mixture/Substance selection:

Substance

Ingredient name	Content (%)	CAS No.	ENCS	Chemical formula
N-Methylmorpholine(4-)	≧99	109-02-4	5-860	CH3N(C2H4)2O

Note : The figures shown above are not the specifications of the product.

Impurities

Formaldehyde ≦0.0080% (CAS No.50-00-0)
Acetaldehyde ≦0.0060% (CAS No.75-07-0)

Section 4. First-aid measures

Descriptions of first-aid measures

General measures

Call a POISON CENTER/doctor/physician if you feel unwell.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.
IF INHALED: Call a POISON CENTER/doctor/physician if you feel unwell.

IF ON SKIN

Take off immediately all contaminated clothing. Rinse skin with water or shower.
Wash with plenty of soap and water.
If skin irritation or rash occurs: Get medical advice/attention.
Call a POISON CENTER/doctor/physician if you feel unwell.

IF IN EYES

Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
If eye irritation persists: Get medical advice/attention.

IF SWALLOWED

Rinse mouth.
IF SWALLOWED: Call a POISON CENTER/doctor/physician if you feel unwell.

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media

Use appropriate extinguishing media suitable for surrounding facilities.
In case of fire, use spraying loaded liquid, foam (water-soluble liquid: alcohol-resistant foam), inactive gases, dry powder, dry sand to extinguish.

*Fire Service Act Group 4 Hazardous Materials

Unsuitable extinguishing media

Indoor Fire Plug System or Outdoor Fire Plug System
Sprinkler System
Dry Chemical Extinguishing System-Others (except for phosphates etc., Hydrogen Carbonates etc.)
Fire Extinguisher Discharging Jet Water/Spraying Water
Fire Extinguisher Discharging Jet Loaded Liquid
Fire Extinguisher Discharging Dry Extinguishing agents-Others (except for phosphates etc., Hydrogen Carbonates etc.)
Water Bucket or Water Tank
*Cabinet Order Concerning the Control of Hazardous Materials (Attached Table 5) Group 4 Hazardous Materials

Specific hazards arising from the substance or mixture

Fire may produce irritating, corrosive and/or toxic gases.
Runoff from fire control or dilution water may cause pollution.
See "10.Stability and Reactivity".

Advice for firefighters

Specific fire-fighting measures

Evacuate non-essential personnel to safe area.

Special protective equipment and precautions for fire-fighters

Wear fire resistant or flame retardant clothing.
Wear protective gloves/protective clothing/eye protection/face protection.
Firefighters should wear self-contained breathing apparatus with a full facepiece operated in the positive pressure mode.

Section 6. Accidental release measures

Personnel precautions, protective equipment and emergency procedures

Keep unauthorized personnel away.
Ventilate area until material pick up is complete.
Wear proper protective equipment.

Environmental precautions

Prevent spills from entering sewers, watercourses, low areas or rivers. To be careful not discharged to the environment without being properly handled waste water contaminated.

Methods and materials for containment and cleaning up

Absorb spill with inert material (dry sand, earth, et al), then place in a chemical waste container.

Preventive measures for secondary accident

Collect spillage.

Section 7. Handling and storage

Precautions for safe handling

Preventive measures

(Exposure Control for handling personnel)

Do not breathe dust/fume/gas/mist/vapors/spray.

(Protective measures against fire and explosion)

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Ground and bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use non-sparking tools.
Take action to prevent static discharges.
(Exhaust/ventilator)
Exhaust/ventilator should be available.
(Safety treatments)
Avoid contact with skin.
Avoid contact with eyes.
Safety Measures
Wear protective gloves/protective clothing/eye protection/face protection.
Wash hands et al thoroughly after handling.
When using do not eat, drink or smoke.
Any incompatibilities
See "10.Stability and Reactivity".
Advice on general occupational hygiene
Take off contaminated clothing and wash it before reuse.
Storage
Conditions for safe storage
Keep container tightly closed.
Store in a cool, dry place. Do not store in direct sunlight.
Storage in accordance with local/national regulation.
Container and packaging materials for safe handling
Use closed unbreakable containers.

Section 8. Exposure controls/personal protection

Control parameters
Administrative Control Levels and Concentration standard value
(Formaldehyde)
Japan control value 0.1ppm
(Acetaldehyde)
Concentration standard value STEL: 10ppm
Occupational Exposure Limit
The Japan Society for Occupational Health
(Formaldehyde)
0.1ppm, 0.12mg/m3; (Ceiling) 0.2ppm, 0.24mg/m3
(Acetaldehyde)
(Ceiling) 10ppm; 18mg/m3
ACGIH
(Formaldehyde)
TWA: 0.1ppm; STEL: 0.3ppm (URT & eye irr; URT cancer)
(Acetaldehyde)
Ceiling: 25ppm (Eye & URT irr)
Notation
(Formaldehyde)
DSEN; RSEN
Exposure controls
Appropriate engineering controls
Do not use in areas without adequate ventilation.

Eye wash station should be available.
Washing facilities should be available.

Individual protection measures

Recommend to use protective equipment in conformity with the standards.
Use appropriate protective equipment in accordance with local/national regulation.

Respiratory protection

Wear respiratory protection (dust-proof mask/gas mask). Select chemical cartridge corresponding to type of gases when using a gas mask.

Hand protection

Wear impervious protective glove.

Eye protection

Wear eye/face protection. Wear safety goggles in cases gas is generated.

Skin and body protection

Wear protective clothing.

Section 9. Physical and Chemical Properties

Information on basic physical and chemical properties

Physical state: Liquid
Color: Colorless, Clear
Odor: Characteristic odor
Melting point/Freezing point: <-70℃
Boiling point or initial boiling point: (N-Methylmorpholine(4-))115.6℃
Boiling range data is not available.
Flammability (gases, liquids and solids) data is not available.
Lower and upper explosion limit/flammability limit data is not available.
Flash point: (N-Methylmorpholine(4-))17.5℃
Auto-ignition temperature data is not available.
Decomposition temperature data is not available.
pH data is not available.
Kinematic viscosity data is not available.
Solubility:

Solubility in water: Soluble
Solubility in solvent data is not available.

n-Octanol/water partition coefficient data is not available.
Vapor pressure data is not available.
Density and/or relative density: 0.92
Relative vapor density (Air=1) data is not available.
Particle characteristics data is not available.

Other information

Other information is not available.

Section 10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Stable under normal storage/handling conditions.

Possibility of hazardous reactions

Not available.

Conditions to avoid
Contact with incompatible materials.
Contact with fire source.
Incompatible materials
Acids, Oxidizing agents
Hazardous decomposition products
Carbon oxides, Nitrogen oxides

Section 11. Toxicological Information

Information on toxicological effects
Acute toxicity
Acute toxicity (Oral)
[Data for components of the product]
[NITE-CHRIP]
(Formaldehyde)
rat LD50: 600 - 700 mg/kg (test substance: 2 - 4% Aqueous solution) (source: NITE)
(Acetaldehyde)
rat LD50: 660 mg/kg (source: NITE)
Acute toxicity (Dermal)
[Product]
Category 4, Harmful in contact with skin
[Data for components of the product]
[NITE-CHRIP]
(N-Methylmorpholine(4-))
female rat LD50: 1820 mg/kg (source: NITE)
(Formaldehyde)
rabbit LD50: 270 mg/kg (test substance: Formalin) (source: NITE)
(Acetaldehyde)
rat LD50: 640 mg/kg (source: NITE)
Acute toxicity (Inhalation)
[Data for components of the product]
[NITE-CHRIP]
(Formaldehyde)
gas: rat LC50: 480 ppm (4-hour) (source: NITE)
(Acetaldehyde)
vapor: rat LC50: 13300 ppm (4-hour) (source: NITE)
Irritant properties
Skin corrosion/irritation
[Data for components of the product]
[NITE-CHRIP]
(Formaldehyde)
Category 1 (source: NITE)
Serious eye damage/irritation
[Data for components of the product]
[NITE-CHRIP]
(Formaldehyde)
Category 2 (source: NITE)
(Acetaldehyde)
Category 2A (source: NITE)

Allergenic and sensitizing effects data is not available.
Mutagenic effects data is not available.
Carcinogenicity
[Data for components of the product]
[IARC]
(Formaldehyde)
Group 1 : Carcinogenic to humans
(Acetaldehyde)
Group 1 : Carcinogenic to humans(Acetaldehyde associated with consumption of alcoholic beverages)
Group 2B : Possibly carcinogenic to humans
[ACGIH]
(Formaldehyde)
A1: Confirmed Human Carcinogen
(Acetaldehyde)
A2: Suspected Human Carcinogen
[NTP]
(Formaldehyde)
Known : Known to be Human Carcinogens
(Acetaldehyde)
RAHC : Reasonably Anticipated to be Human Carcinogens
[EU]
(Formaldehyde)
Category 1B; Substances presumed to have carcinogenic potential for humans
(Acetaldehyde)
Category 1B; Substances presumed to have carcinogenic potential for humans
Reproductive toxicity data is not available.
Specific target organ toxicity (STOT)
STOT-single exposure
[Data for components of the product]
[NITE-CHRIP]
(Acetaldehyde)
Category 3 (Narcotic effects) (source: NITE)
STOT-repeated exposure data is not available.
Aspiration hazard data is not available.

Section 12. Ecological Information

Toxicity
Aquatic toxicity
[Data for components of the product]
Hazardous to the aquatic environment, short-term (acute)
[NITE-CHRIP]
(Formaldehyde)
Algae (Desmodesmus subspicatus) 72-hour ErC50: 4.89 mg a.i./L (a.i.: active ingredient)
(source: NITE)
(Acetaldehyde)
Algae (Pseudokirchneriella subcapitata) 72-hour ErC50: 26 mg/L (source: NITE)
Crustacea (Mysidopsis bahia) 96-hour LC50: 27.4 mg/L (source: NITE)
Hazardous to the aquatic environment, long-term (chronic)

[NITE-CHRIP]
(Formaldehyde)
Crustacea (Ceriodaphnia dubia) 7-day NOEC: 1.0 mg/L (source: NITE)
(Acetaldehyde)
Algae (Pseudokirchneriella subcapitata) 72-hour NOEC: 1.9 mg/L (source: NITE)

Water solubility
(Formaldehyde)
not poorly water-soluble (400000 mg/L) (source: NITE)
(Acetaldehyde)
miscible (source: ICSC, 2003)

Persistence and degradability
[Data for components of the product]
(Formaldehyde)
Rapidly degradable (Degradation rate: 87 - 96% (by BOD)) (source: NITE)
(Acetaldehyde)
Not rapidly degradable (Degradation rate: 80% (by BOD); 93% (by TOC); 100% (by GC)) (source: NITE)

Bioaccumulative potential
[Data for components of the product]
(Formaldehyde)
log Kow: 0.35 (source: NITE)
(Acetaldehyde)
log Kow: -0.34 (source: NITE)

Mobility in soil
Mobility in soil data is not available.

Other adverse effects
Ozone depleting chemical data is not available.

Section 13. Disposal considerations

Description of waste residues and information on their safe handling and methods of disposal, including the disposal of any contaminated packaging

Waste treatment methods
Dispose of contents/container as industrial waste. Accordance with local/national regulation.

Section 14. Transport Information

UN Number or ID Number : 2535
UN Proper Shipping Name :
4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)
Class or division (Transport hazard class) : 3
Subsidiary hazard(s) : 8
Packing group : II
ERG GUIDE No.: 132

IMDG Code (International Maritime Dangerous Goods Regulations)
UN Number or ID Number : 2535
UN Proper Shipping Name :
4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)
Class or division (Transport hazard class) : 3

Subsidiary hazard(s) : 8
Packing group : II

IATA (Dangerous Goods Regulations)
UN Number or ID Number : 2535
UN Proper Shipping Name :
4-METHYLMORPHOLINE (N-METHYLMORPHOLINE)
Class or division (Transport hazard class) : 3
Subsidiary hazard(s) : 8
Hazard labels : Flamm. liquid & Corrosive
Packing group : II

Environmental hazards
Marine pollutants (yes/no) : no

Section 15. Regulatory Information

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

U.S. Toxic Substances Control Act (TSCA) Inventory

Chemicals listed in TSCA Inventory

Formaldehyde; Acetaldehyde; N-Methylmorpholine(4-)

Other regulatory information

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

Section 16. Other information

References and sources for data

Globally Harmonized System of classification and labelling of chemicals, UN
Recommendations on the TRANSPORT OF DANGEROUS GOODS 23rd edit., 2023 UN
IMDG Code, 2024 Edition (Incorporating Amendment 42-24)
IATA Dangerous Goods Regulations (66th Edition) 2025
2024 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
2025 TLVs and BEIs. (ACGIH)
JIS Z 7252 : 2019
JIS Z 7253 : 2019
2024 Recommendation on TLVs (JSOH)
Supplier's data/information

General Disclaimer

All chemicals have unknown hazard. Handle the product with care.
This data sheet was created based on the information we currently have and may be revised according to new information. In addition, the precautions apply only to normal handling, and in the case of special handling, please make adequate countermeasure to maintain your safety.
The data given here is based on current knowledge and experience. The purpose of this Safety Data Sheet is to describe the products in terms of their safety requirements. The data does not signify any warranty with regard to the products' properties.
The GHS classification data given here is based on current Data published in Japan (National Institute of Technology and Evaluation (NITE) Chemical Risk Information Platform

(NITE-CHRIP), up to FY2023).