Date of issue: 2018/04/16
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Safety Data Sheet

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

Product identifier:
Product name: Morpholine
SDS No. : 5124E-5
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 3
HEALTH HAZARDS
Acute toxicity (Oral): Category 4
Acute toxicity (Dermal): Category 3
Acute toxicity (Inhalation): Category 3
Skin corrosion/irritation: Category 1
Serious eye damage/eye irritation: Category 1
Specific target organ toxicity - single exposure: Category 1 (respiratory system)
Specific target organ toxicity - repeated exposure: Category 1 (respiratory system)
ENVIRONMENT HAZARDS
Hazardous to the aquatic environment, short-term (acute): Category 3
(Note) GHS classification without description: Not classified/Classification not possible
Label elements

Signal word: Danger
HAZARD STATEMENT
H226 Flammable liquid and vapor
H302 Harmful if swallowed
H311 Toxic in contact with skin
H331 Toxic if inhaled
H314 Causes severe skin burns and eye damage
H370 Causes damage to organs (respiratory system)
H372 Causes damage to organs through prolonged or repeated exposure (respiratory system)
H402 Harmful to aquatic life
PRECAUTIONARY STATEMENT

Prevention

P273 Avoid release to the environment.

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.

P260 Do not breathe dust/fume/gas/mist/vapors/spray.

P271 Use only outdoors or in a well-ventilated area.

P264 Wash contaminated parts thoroughly after handling.

P280 Wear protective gloves/protective clothing/eye protection/face protection.

P270 Do not eat, drink or smoke when using this product.

Response

P370 + P378 In case of fire: Use appropriate media to extinguish.

P314 Get medical advice/attention if you feel unwell.

P310 Immediately call a POISON CENTER/doctor/physician.

P311 Call a POISON CENTER/doctor/physician.

P312 Call a POISON CENTER/doctor/physician if you feel unwell.

P308 + P311 IF exposed or concerned: Call a POISON CENTER/doctor/physician.

P304 + P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

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.

P363 Wash contaminated clothing before reuse.

P361 + P364 Take off immediately all contaminated clothing and wash it before reuse.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P330 IF SWALLOWED: Rinse mouth.

P301 + P312 IF SWALLOWED: Call a POISON CENTER/doctor/physician if you feel unwell.

P301 + P330 + P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.

Storage

P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

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

P405 Store locked up.

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.	Chemicals No, Japan	Chemical formula
Morpholine	99(min)	110-91-8	5-859	C4H9NO

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

Impurities

2-Methoxyethanol ≦0.29% (CAS No.109-86-4)

Section 4. First-aid measures

Descriptions of first-aid measures

General measures

Get medical advice/attention if you feel unwell.

IF INHALED

Remove person to fresh air and keep comfortable for breathing.

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.

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.

Do NOT induce vomiting.

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
Use only outdoors or in a well-ventilated area.
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
Wash contaminated parts thoroughly after handling.
Do not eat, drink or smoke when using this product.
Take off immediately all contaminated clothing and wash it before reuse.
Storage
Conditions for safe storage
Keep container tightly closed.
Store locked up. (P405)
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
Control value and Concentration standard value
(2-Methoxyethanol)
Japan control value 0.1ppm
Adopted value
(2-Methoxyethanol)
JSOH(2009) 0.1ppm; 0.31mg/m3 (skin)
(Morpholine)
ACGIH(1996) TWA: 20ppm (Eye dam; URT irr)
(2-Methoxyethanol)
ACGIH(2006) TWA: 0.1ppm (Hematologic eff; repro eff)
[ACGIH] Notation
(Morpholine)
Skin
(2-Methoxyethanol)
Skin
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～pale yellow

Odor: Slightly amine odor

Melting point/Freezing point: −5℃

Boiling point or initial boiling point: (Morpholine)129℃

Boiling range data is not available.

Flammability (gases, liquids and solids) data is not available.

Lower and upper explosion limit/flammability limit:

Lower explosion limit: 1.4 vol %

Upper explosion limit: 11.2 vol %

Flash point: (Morpholine)(C.C.) 35℃

Auto-ignition temperature: (Morpholine)310℃

Decomposition temperature data is not available.

pH data is not available.

Kinematic viscosity data is not available.

Solubility:

Solubility in water: Miscible

Solubility in solvent data is not available.

n-Octanol/water partition coefficient: log Pow-0.86

Vapor pressure: 1.06 kPa (20℃)

Density and/or relative density: 1.0

Relative vapor density (Air=1): 3

Relative density of the Vapor/air - mixture at 20℃ (Air = 1): 1.01

Particle characteristics data is not available.

Other information

Other information is not available.

Section 10. Stability and Reactivity

Reactivity

Not available.

Chemical stability

Hygroscopic materials.

Possibility of hazardous reactions

(Morpholine)

Decomposes on burning. This produces toxic fumes of nitrogen oxides and carbon monoxide. The substance is a medium strong base. Reacts with strong oxidants. This generates fire hazard. Attacks plastics, rubber and coatings. Unstable if stored in copper or zinc containers. (ICSC 0302)

Conditions to avoid

Contact with incompatible materials.

Contact with fire source.

Incompatible materials

Strong oxidizing agents

Hazardous decomposition products

Carbon oxides, Nitrogen oxides

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity

Acute toxicity (Oral)

[Product]

Category 4, Harmful if swallowed

[Data for components of the product]

[GHS Cat. Japan, base data]

(Morpholine)

rat LD50=1050mg/kg (EHC 179, 1996; IARC 47, 1989; ACGIH 7th, 2001; PATTY 6th, 2012) et al.

(2-Methoxyethanol)

rat LD50=2370-5490mg/kg (PATTY 6th, 2012)

Acute toxicity (Dermal)

[Product]

Category 3, Toxic in contact with skin

[Data for components of the product]

[GHS Cat. Japan, base data]

(Morpholine)

rabbit LD50=0.5mL/kg=504mg/kg (EHC 179, 1996; IARC 47, 1989; PATTY 6th, 2012; SIDS, 2015)

(2-Methoxyethanol)

rabbit LD50=1280mg/kg (MOE risk assessment vol.4, 2005)

Acute toxicity (Inhalation)

[Product]

Category 3, Toxic if inhaled

[Data for components of the product]

[GHS Cat. Japan, base data]

(Morpholine)

vapor: rat LC50=7.8mg/L/4hr=2192ppm/4hr(female) (EHC 179, 1996); < 90% of saturated vapor press. conc. (10495ppm)

(2-Methoxyethanol)

vapor: rat LC50=5136ppm (CICAD 67, 2010)

Irritant properties

Skin corrosion/irritation

[Product]

Category 1, Causes severe skin burns and eye damage

[Data for components of the product]

[GHS Cat. Japan, base data]

(Morpholine)

human corrosive (SIDS, 2015); rabbit corrosive (EHC 179, 1996; IARC 47, 1989; ACGIH 7th, 2001; PATTY 6th, 2012; SIDS, 2015); EU CLP Skin Corr. 1B (ECHA CL Invt., Access on Jun. 2017)

Serious eye damage/irritation

[Product]

Category 1, Causes serious eye damage
[Data for components of the product]
[GHS Cat. Japan, base data]
(Morpholine)
Skin corr. cat. 1, human/rabbit severe (IARC 47, 1989; ACGIH 7th, 2001; IARC 47, 1989; PATTY 6th, 2012; EHC 179, 1996)

Allergenic and sensitizing effects data is not available.

Mutagenic effects data is not available.

Carcinogenicity
[Data for components of the product]
[IARC]
(Morpholine)
Group 3 : Not classifiable as to its carcinogenicity to humans
[ACGIH]
(Morpholine)
A4(1996) : Not Classifiable as a Human Carcinogen

Reproductive toxicity
[Data for components of the product]
[GHS Cat. Japan, base data]
(2-Methoxyethanol)
cat. 1B; NITE Initial Risk Assessment Report, 2007

Specific target organ toxicity (STOT)

STOT-single exposure
[Product]
Category 1, Causes damage to organs
[Data for components of the product]
[cat.1]
[GHS Cat. Japan, base data]
(Morpholine)
respiratory system (PATTY 6th, 2012)
[cat.3 (respiratory tract irritation)]
[GHS Cat. Japan, base data]
(2-Methoxyethanol)
respiratory tract irritation (NITE Initial Risk Assessment Report, 2007; CICAD 67, 2010)
[cat.3 (narcotic effects)]
[GHS Cat. Japan, base data]
(2-Methoxyethanol)
narcotic effect (NITE Initial Risk Assessment Report, 2007; CICAD 67, 2010)

STOT-repeated exposure
[Product]
Category 1, Causes damage to organs through prolonged or repeated exposure
[Data for components of the product]
[cat.1]
[GHS Cat. Japan, base data]
(Morpholine)
respiratory system (MOE Environmental Risk Assessment for Chemical Substances vol. 4, 2005; EHC 179, 1996; ACGIH 7th, 2001; PATTY 6th, 2012; IARC 47, 1989)

Aspiration hazard data is not available.

Section 12. Ecological Information

Toxicity

Aquatic toxicity

[Product]

Category 3, Harmful to aquatic life

[Data for components of the product]

Hazardous to the aquatic environment, short-term (acute)

[GHS Cat. Japan, base data]

(Morpholine)

Crustacea (Daphnia magna) EC50=45mg/L/48hr (MOE Japan, 2017)

(2-Methoxyethanol)

Crustacea (Daphnia magna) EC50 >85mg/L/48hr (MOE Japan, 2002)

Hazardous to the aquatic environment, long-term (chronic)

[GHS Cat. Japan, base data]

(Morpholine)

Crustacea (Daphnia magna) NOEC (Reproductive inhibition)=5.0mg/L/21days (OECD SIDS, 2013);
Algae (Pseudokirchneriella subcapitata) NOEC(Speed method)=30.9mg/L/72hr (MOE Japan, 2005)

Water solubility

(Morpholine)

miscible (ICSC, 2000)

(2-Methoxyethanol)

100 g/ml (PHYSPROP_DB, 2005)

Persistence and degradability

[Data for components of the product]

(Morpholine)

Not rapidly degradable (BOD_Degradation : 0% (CSCL DB, 1979))

(2-Methoxyethanol)

Rapidly degradable (BOD_ 2 weeks Degradation : 73, 82, 94% (METI existing chemical safety inspections 1988))

Bioaccumulative potential

[Data for components of the product]

(Morpholine)

log Pow=-0.86 (ICSC, 2000); BCF=0.65 (Check & Review, Japan)

(2-Methoxyethanol)

log Pow=-0.503 (ICSC, 2003)

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

Avoid release to the environment.

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

Section 14. Transport Information

UN Number or ID Number : 2054
UN Proper Shipping Name :
MORPHOLINE
Class or division (Transport hazard class) : 8
Subsidiary hazard(s) : 3
Packing group : I
ERG GUIDE No.: 132

IMDG Code (International Maritime Dangerous Goods Regulations)

UN Number or ID Number : 2054
UN Proper Shipping Name :
MORPHOLINE
Class or division (Transport hazard class) : 8
Subsidiary hazard(s) : 3
Packing group : I

IATA (Dangerous Goods Regulations)

UN Number or ID Number : 2054
UN Proper Shipping Name :
MORPHOLINE
Class or division (Transport hazard class) : 8
Subsidiary hazard(s) : 3
Hazard labels : Corrosive & Flamm.liquid
Packing group : I

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

2-Methoxyethanol; Morpholine

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 22nd edit., 2021 UN
IMDG Code, 2022 Edition (Incorporating Amendment 41-22)
IATA Dangerous Goods Regulations (65th Edition) 2024
2020 EMERGENCY RESPONSE GUIDEBOOK (US DOT)
2024 TLVs and BEIs. (ACGIH)
JIS Z 7252 : 2019
JIS Z 7253 : 2019
2023 Recommendation on TLVs (JSOH)
Supplier's data/information

General Disclaimer

The Safety Data Sheet (SDS) is copyrighted material of KISHIDA CHEMICAL CO., LTD.
Please provide SDS to customers for selling or transferring.
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 Japan official data (NITE published in 2022).