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Hefei TNJ Chemical Industry Co.,Ltd.

B911 Xincheng Business Center,
Qianshan Rd. Hefei 230022 China

Tel : (0086) 551 65418695

Fax: (0086) 551 65418697

Email: info@tnjchem.com

Site: www.tnjchem.com

Material Safety Data Sheet

4-Methylmorpholine

Section 1: Chemical Product and Company Identification

Product Name: 4-Methylmorpholine

Catalog Codes: SLM1606

CAS#: 109-02-4

RTECS: QE5775000

TSCA: TSCA 8(b) inventory: 4-Methylmorpholine

CI#: Not available.

Synonym: N-Methylmorpholine; morpholine, 4-methyl-; 4-Methyl-1-oxa-4-azacyclohexane

Chemical Name: 4-Methylmorpholine

Chemical Formula: C₅H₁₁NO

Contact Information for Emergency: (0086) 551 65418681

Hefei TNJ Chemical Industry Co.,Ltd.

B911 Xincheng Business Center

Tel : (0086) 551 65418695

Qianshan Road, Hefei

Fax: (0086) 551 65418697

230004Anhui

Email: info@tnjchem.com

China

Site: www.tnjchem.com

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
4-Methylmorpholine	109-02-4	100

Toxicological Data on Ingredients: 4-Methylmorpholine: ORAL (LD50): Acute: 1960 mg/kg [Rat]. 1970 mg/kg [Mouse]. DERMAL (LD50): Acute: 1820 mg/kg [Rat]. VAPOR (LC50): Acute: 25200 mg/m³ 2 hours [Mouse].

Section 3: Hazards Identification

Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation. Slightly hazardous in case of skin contact (corrosive), of eye contact (corrosive). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to lungs. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection.

Section 4: First Aid Measures

Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get medical attention immediately.

Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 165°C (329°F)

Flash Points: CLOSED CUP: 23.889°C (75°F).

Flammable Limits: LOWER: 2.2% UPPER: 11.8%

Products of Combustion: These products are carbon oxides (CO, CO₂), nitrogen oxides (NO, NO₂).

Fire Hazards in Presence of Various Substances:

Highly flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

Fire Fighting Media and Instructions:

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards:

When heated to decomposition it emits highly toxic and irritating fumes. Vapor may travel considerable distance to source of ignition and flash back.

Special Remarks on Explosion Hazards:

Can release vapors that form explosive mixtures at temperatures above the flash point. Vapors may form explosive mixtures with air

Section 6: Accidental Release Measures

Small Spill:

Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of acetic acid.

Large Spill:

Flammable liquid. Corrosive liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of acetic acid.

Section 7: Handling and Storage

Precautions:

Keep container dry. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from

incompatibles such as oxidizing agents, acids.

Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits: Not available.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ammoniacal. (Strong.)

Taste: Not available.

Molecular Weight: 101.15 g/mole

Color: Clear Colorless.

pH (1% soln/water): 10.6 [Basic.]

Boiling Point: 115°C (239°F)

Melting Point: -66.111°C (-87°F)

Critical Temperature: Not available.

Specific Gravity: 0.9 (Water = 1)

Vapor Pressure: 0.7 kPa (@ 20°C)

Vapor Density: 3.5 (Air = 1)

Volatility: Not available.

Odor Threshold: Not available.

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water.

Solubility: Soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Heat, ignition sources (flames, sparks, static), incompatible materials

Incompatibility with various substances: Reactive with oxidizing agents, acids.

Corrosivity: Not available.

Special Remarks on Reactivity: Incompatible with acid anhydrides, acid chlorides, carbon dioxide

Special Remarks on Corrosivity: Not available.

Polymerization: Will not occur.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.

Acute oral toxicity (LD50): 1960 mg/kg [Rat]. Acute dermal toxicity (LD50): 1820 mg/kg [Rat]. Acute toxicity of the vapor (LC50): 25200 mg/m 2 hours [Mouse].

Chronic Effects on Humans: May cause damage to the following organs: lungs.

Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant). Hazardous in case of skin contact (permeator), of ingestion, of inhalation (lung corrosive). Slightly hazardous in case of skin contact (corrosive), of eye contact (corrosive).

Special Remarks on Toxicity to Animals:

Lethal Dose/Conc 50% Kill LD50 [Rabbit] - Route: Skin; Dose: 1350 ul/kg

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans:

Acute Potential Health Effects: Skin: Causes skin irritation and possible burns. May be absorbed through the skin in harmful amounts. Eyes: Causes eye irritation with possible burns. May cause conjunctivitis. Inhalation: Causes respiratory tract irritation. Irritation may lead to chemical pneumonitis and pulmonary edema. Ingestion: Causes gastrointestinal tract irritation with nausea, vomiting and diarrhea. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may cause defatting and dermatitis.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 3: Flammable liquid. Class 8: Corrosive material

Identification: : 4-Methylmorpholine UNNA: 2535 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:

Pennsylvania RTK: 4-Methylmorpholine Florida: 4-Methylmorpholine Massachusetts RTK: 4-Methylmorpholine
New Jersey: 4-Methylmorpholine TSCA 8(b) inventory: 4-Methylmorpholine

Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS E: Corrosive liquid.

DSCL (EEC):

R11- Highly flammable. R20/21/22- Harmful by inhalation, in contact with skin and if swallowed. R34- Causes burns. S16-Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 3

Reactivity: 0

Personal Protection:

National Fire Protection Association (U.S.A.):

Health: 3

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2009 06:31 PM

Last Updated: 05/21/2015 12:00 PM

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