Material Safety Data Sheet

Dimethyl Formamide

Section 1 - Product Identification

Synonyms : DMF

Molecular Weight : 73.09 g/mol

Chemical Formula : C_3H_7NO

Company Identification : Tradeasia International Pte. Limited

Address : 133 Cecil Street # 12-03 Keck Seng Tower, Singapore
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Recommended use of the chemical and restrictions on use:

The product is widely used as a chemical solvent in the batteries, paint and coatings industry. It is also used in chemical synthesis as a green solvent.

Section 2 – Composition/Information on Ingredients

Product Name	EC/CAS No	Concentration
Dimethyl Formaldehyde	200-679-5/68-12-2	<= 100%

Section 3 – Hazards Identification

3.1 GHS Classification

Flammable liquids (Category 3), H226

Acute toxicity, Inhalation (Category 4), H332

Acute toxicity, Dermal (Category 4), H312

Serious eye damage/eye irritation (Category 2), H319

Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

3.2 Label elements

Hazard statement(s)

H226 Flammable liquid and vapour.

H312 + H332 Harmful in contact with skin or if inhaled.

H319 Causes serious eye irritation.

H360 May damage fertility or the unborn child.

Precautionary statement(s)

Prevention

P201 Obtain special instructions before use.

P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.

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

Response

P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P337 + P313 If eye irritation persists: Get medical advice/ attention.

P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage

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

Restricted to professional users.

3.3 Other hazards

Rapidly absorbed through skin.

Section 4 – First-Aid Measures

4.1. Description of first aid mesaures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.

Skin contact

Wash off with soap and plenty of water, do not rub the skin. If irritation persists, obtain medical attention.

Eye contact

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

Inhalation

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Ingestion

Rinse mouth with water. Do not induce vomiting. Drink as much water as possible. If large amounts are swallowed (i.e. more than one teaspoon), contact a doctor or toxicity centre immediately.

4.2. Most important symptoms and effects, both acute and delayed

Most important known symptoms and effects are described in the labelling (section 2.2) and/or in section 11.

4.3. Indication of any immediate medical attention and special treatment needed

N.A.

Section 5 – Fire Fighting Measures

5.1. Suitable Extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2. Specific hazards arising from the chemical

Carbon oxides, Nitrogen oxides (NOx)

5.3. Special protective actions for fire-fighters

Wear self-contained breathing apparatus for firefighting if necessary

5.4. Further information

Use water spray to cool unopened containers

Section 6 – Accidental Release Measures

6.1. Personal precautions, protective equipment and emergency procedures

Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

6.2. Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3. Methods and material for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections

For disposal see section 13.

Section 7 – Handling and Storage

7.1. Precautions for safe Handling

Avoid exposure - obtain special instructions before use. Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the buildup of electrostatic charge. For precautions see section 2.2.

7.2. Conditions for safe storage, including any incompatibilities

Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Handle and store under inert gas.

Section 8 – Exposure Controls/Personal Protection

8.1. Control parameters

Dimethyl Formamide: PEL (long term), 10ppm, 30mg/m^3 – Basis: Singapore Workplace Safety and Health Act, First Schedule Permissible Exposure Limits of Toxic Substances.

8.2. Appropriate engineering controls

General industrial hygiene practice. Wash hands before breaks and at the end of workday.

8.3. Individual protection measures, such as personal protective equipment (PPE)

Respirator:

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Clothing:

Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Gloves:

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection:

Wear safety goggles or face shield which are tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Section 9 – Physical and Chemical Properties

9.1. Information on basic physical and chemical properties

Appearance : colourless liquid

Odour : amine-like

Odour threshold : N.A.

pH @ 20°C : 6.7

Melting point : -61°C

Boiling point : 153°C – lit.

Flash point : 58°C – closed cup

Evaporation rate : N.A.

Flammability : N.A.

Upper/lower flammability or explosive limits : UFL – 15.2% (V), LFL – 2.2% (V)

Vapour pressure : 3.60 hPa at 20°C, 5.16 hPa at 25°C

Vapour density : 2.52 (Air = 1.0)

Relative density : 0.944 g/mL at 25°C

Solubility in water : completely miscible

Partition coefficient, n-octanol/water: log Po/w = -1.01 at 20°C

Section 10 – Stability and Reactivity

10.1. Reactivity

N.A.

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

N.A.

10.4. Conditions to avoid:

Heat, flames and sparks.

10.5. Incompatible materials

Strong oxidizing agents

10.6. Hazardous decomposition products

Hazardous decomposition products formed under fire conditions – carbon oxides and nitrogen oxides.

Section 11 – Toxicological Information

Information on toxicological effects

Acute toxicity

LD50 Oral - Rat - male and female - > 3.010 mg/kg (Dimethyl formamide) (OECD Test Guideline 401)

LD50 Dermal - Rabbit - male and female - > 1.500 mg/kg (Dimethyl formamide)

Skin corrosion/irritation

Skin – Rabbit (Dimethyl formamide), Result: No skin irritation

Serious eye damage/eye irritation

Eyes – Rabbit (Dimethyl formamide), Result: No eye irritation,

Respiratory or skin sensitisation

Freund's complete adjuvant test - Guinea pig (Dimethyl formamide), Result: negative (OECD Test Guideline 406)

Germ cell mutagenicity

Ames test, Salmonella typhimurium, Result: negative (ECHA)

Mouse – male – Bone marrow, Result: negative (ECHA)

Carcinogenicity

Did not show carcinogenic effects in animal experiments (Lit.)

IARC: Group 3: Not classifiable as to its carcinogenicity to humans.

Reproductive toxicity

May damage unbord child.

Specific target organ toxicity - single exposure

Acute oral toxicity - Gastrointestinal disturbance, Nausea, Vomiting

Acute inhalation toxicity - Possible damages:, mucosal irritations

Specific target organ toxicity - repeated exposure

Aspiration hazard

No data available (Dimethyl carbonate)

Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 28 d - No observed adverse effect level - 238 mg/kg - Lowest observed adverse effect level - 475 mg/kg
Subacute toxicity
RTECS: LQ2100000

Warning: intolerance for alcohol can occur up to 4 days after dimethylformamide exposure. N, N-dimethylformamide is considered to be a potent liver toxin., Vomiting, Diarrhoea, Abdominal pain, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:
Headache, Dizziness, Drowsiness
Damage to:
Kidney, Liver
This substance should be handled with particular care

Section 12 – Ecological Information

12.1.Toxicity

Toxicity to fish: flow-through test LC50 - Lepomis macrochirus (Bluegill sunfish) - 7.100 mg/l - 96 h (N,N-Dimethylformamide) (US-EPA)

Toxicity to daphnia and other aquatic invertebrates: static test EC50 - Daphnia magna (Water flea) - 13.100 mg/l - 48 h (N,NDimethylformamide) (OECD Test Guideline 202)

Toxicity to algae: static test EC50 - Desmodesmus subspicatus (green algae) - > 1.000 mg/l – 72 h (N,N-Dimethylformamide) (DIN 38412)

Toxicity to bacteria: static test EC50 - Vibrio fischeri - 12.300 - 17.500 mg/l - 5 min (N,NDimethylformamide)
Remarks: (External MSDS)

12.2. Persistence and degradability

Biodegradability aerobic - Exposure time 21 d (N,N-Dimethylformamide), Result: 100 % - Readily biodegradable.

Biochemical Oxygen Demand (BOD): 900 mg/g (N,N-Dimethylformamide), Remarks: (Lit.)

Theoretical oxygen demand: 1.863 mg/g (N,N-Dimethylformamide) Remarks: (Lit.)

12.3. Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 56 d (N,N-Dimethylformamide)

Bioconcentration factor (BCF): 0,3 - 1,2 (OECD Test Guideline 305C)

Remarks: Does not significantly accumulate in organisms.

12.4. Mobility in soil

N.A

12.5. Other adverse effects

N.A

Section 13 – Disposal Considerations

13.1. Disposal methods

Product:

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging:

Dispose of as unused product

Section 14 – Transport Information

14.1. UN number : ADR/RID: 2265 IMDG: 2265 IATA-DGR: 2265

14.2. UN proper shipping name: ADR/RID, IMDG, IATA-DGR - N,N-DIMETHYLFORMAMIDE

14.3. Transport of hazard classes : ADR/RID: 3 IMDG: 3 IATA-DGR: 3

14.4. Packing group : ADR/RID: III IMDG: III IATA-DGR: III

14.5. Environmental hazards : ADR/RID: no IMDG Marine pollutant: no IATA-DGR: no

14.6. Special precautions for user : Based on chemical properties, choose appropriate tools and conditions of t appropriate and sufficient firefighting equipment and emergency leaking in specified route.

14.7. Incompatible materials: N.A.

Section 15 – Regulatory Information

15.1. Safety, health and environmental regulations for the substance/mixture:

AICS: On the inventory, or in compliance with the inventory

DSL: All components of this product are on the Canadian DSL

ENCS: On the inventory, or in compliance with the inventory

ISHL: On the inventory, or in compliance with the inventory

KECI: On the inventory, or in compliance with the inventory

NZIoC: On the inventory, or in compliance with the inventory

PICCS: On the inventory, or in compliance with the inventory

Section 16 : Additional Information

16.1. Full text of H-Statements referred to under sections 3:

H226 Flammable liquid and vapour.

H312 Harmful in contact with skin.

H319 Causes serious eye irritation.

H332 Harmful if inhaled.

H360 May damage fertility or the unborn child.

16.2. Disclaimer of Liability

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