1. PRODUCT AND COMPANY IDENTIFICATION

Product name : N,N-Dimethylformamide
Product Number : D8300
Brand : Sigma
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +18003255832
Fax : +18003255052
Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards
Combustible Liquid, Harmful by skin absorption., Irritant, Teratogen

Target Organs
Liver, Kidney, Central nervous system, Cardiovascular system., Blood

Other hazards which do not result in classification
Rapidly absorbed through skin.

GHS Label elements, including precautionary statements

Pictogram

Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H303 May be harmful if swallowed.
H312 Harmful in contact with skin.
H316 Causes mild skin irritation.
H319 Causes serious eye irritation.
H331 Toxic if inhaled.
H360 May damage fertility or the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P280 Wear protective gloves/protective clothing.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P311 Call a POISON CENTER or doctor/physician.

HMIS Classification
Health hazard: 2
Chronic Health Hazard: *
Flammability: 2
Physical hazards: 0
NFPA Rating
Health hazard: 2
Fire: 2
Reactivity Hazard: 0

Potential Health Effects
Inhalation May be harmful if inhaled. Causes respiratory tract irritation.
Skin Harmful if absorbed through skin. Causes skin irritation.
Eyes Causes eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Formula : C₃H₇NO
Molecular Weight : 73.09 g/mol

<table>
<thead>
<tr>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Concentration</th>
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<td>68-12-2</td>
<td>200-679-5</td>
<td>616-001-00-X</td>
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4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

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

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

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

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIRE-FIGHTING MEASURES

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

Special protective equipment for fire-fighters
Wear self contained breathing apparatus for fire fighting if necessary.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.
Conditions for safe storage
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.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
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<td>68-12-2</td>
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Personal protective equipment

Respiratory protection
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).

Hand protection
Handle with gloves.

Eye protection
Face shield and safety glasses

Skin and body protection
Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Hygiene measures
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance
Form liquid, clear
Colour colourless
Odour amine-like

Safety data
pH 6.7
Melting point -61 °C (-78 °F)
Boiling point 153 °C (307 °F) at 1,013 hPa (760 mmHg)
Flash point 58 °C (136 °F) - closed cup
Ignition temperature 445 °C (833 °F)
Lower explosion limit 2.2 % (V)
Upper explosion limit 15.2 % (V)
Vapour pressure 3.60 hPa (2.70 mmHg) at 20 °C (68 °F)
Density 0.948 g/cm³
Water solubility completely miscible
Partition coefficient:
n-octanol/water log Pow: -1.01
Relative vapour density 2.52

10. STABILITY AND REACTIVITY
Chemical stability
Stable under recommended storage conditions.

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)

11. TOXICOLOGICAL INFORMATION
Acute toxicity
LD₅₀ Oral - rat - 2,800 mg/kg
LC₅₀ Inhalation - rat - 4 h - 9 - 15 mg/l
LD₅₀ Dermal - rabbit - 4,720 mg/kg
LD₅₀ Dermal - rabbit - 1,500 mg/kg

Skin corrosion/irritation
Skin - Human - Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - rabbit - Moderate eye irritation

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
Genotoxicity in vitro - mouse - lymphocyte
Mutation in mammalian somatic cells.

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

Specific target organ toxicity - single exposure (GHS)
no data available

Specific target organ toxicity - repeated exposure (GHS)
no data available

Aspiration hazard
no data available

Potential health effects

| Inhalation | May be harmful if inhaled. Causes respiratory tract irritation. |
| Ingestion  | May be harmful if swallowed.                                    |
| Skin       | Harmful if absorbed through skin. Causes skin irritation.       |
| Eyes       | Causes eye irritation.                                          |

Signs and Symptoms of Exposure
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.

Additional Information
RTECS: LQ2100000

12. ECOLOGICAL INFORMATION

Toxicity

| Toxicity to fish | LC50 - Oncorhynchus mykiss (rainbow trout) - 9,000 - 13,000 mg/l - 96 h |
|                 | LC50 - Lepomis macrochirus (Bluegill) - 6,700 - 7,500 mg/l - 96 h       |
|                 | LC50 - Pimephales promelas (fathead minnow) - 10,400 - 10,800 mg/l - 96 h |
|                 | LC50 - Oncorhynchus mykiss (rainbow trout) - 9,800 mg/l - 96 h          |
|                 | LC50 - Lepomis macrochirus (Bluegill) - 6,300 mg/l - 96 h               |
|                 | LC50 - Pimephales promelas (fathead minnow) - 10,600 mg/l - 96 h       |

| Toxicity to daphnia and other aquatic invertebrates. | EC50 - Daphnia magna (Water flea) - 9,600 - 13,100 mg/l - 48 h |
|                                                     | EC50 - Daphnia magna (Water flea) - 15,700 mg/l - 48 h |

| Toxicity to algae | LC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 96 h |

Persistence and degradability

Biodegradability

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects
no data available
13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN-Number: 2265  Class: 3  Packing group: III
Proper shipping name: N,N-Dimethylformamide
Reportable Quantity (RQ): 100 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN-Number: 2265  Class: 3  Packing group: III  EMS-No: F-E, S-D
Proper shipping name: N,N-DIMETHYLFORMAMIDE
Marine pollutant: No

IATA
UN-Number: 2265  Class: 3  Packing group: III
Proper shipping name: N,N-Dimethylformamide

15. REGULATORY INFORMATION

OSHA Hazards
Combustible Liquid, Harmful by skin absorption., Irritant, Teratogen

DSL Status
All components of this product are on the Canadian DSL list.

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

<table>
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SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

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Pennsylvania Right To Know Components

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New Jersey Right To Know Components

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California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION
Further information
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