

# SAFETY DATA SHEET



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## 24-Hour Emergency Number (CHEMTREC)

USA: 800-424-9300  
International: 703-527-3887

All non-emergency numbers should be directed  
to Customer Service at 800-PURITY1

## N,N-DIMETHYLFORMAMIDE

SDS No. M0081

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: N,N-Dimethylformamide

Synonyms: DMF; Dimethylformamide; Formyldimethylamine; Formamide, N,N-Dimethyl-

Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

### 2. HAZARDS IDENTIFICATION



#### **Classification:**

Flammable Liquids: GHS Category 3

Acute Toxicity, Inhalation: GHS Category 4

Acute Toxicity, Dermal: GHS Category 4

Eye Irritation: GHS Category 2A

Reproductive Toxicity: GHS Category 1B

#### **Label Elements**

Signal Word: DANGER!

#### Hazard Statements:

H226 – Flammable Liquid and vapor.

H312 – Harmful in contact with skin.

H319 – Causes serious eye irritation.

H332 – Harmful if inhaled.

H360 – May damage fertility or the unborn child.

#### Precautionary Statements:

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

P243 – Take precautionary measures against static discharge.

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

P303+P361+P353 – If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

**Emergency Overview:**

Harmful if swallowed, inhaled, or absorbed through the skin. May cause harm to the unborn child. Causes irritation to the skin, eyes, and respiratory tract. May cause liver damage. Flammable liquid and vapor. Target Organs: Liver, respiratory system, eyes, and skin.

**HMIS Rating:**

Health – 2\* Flammability – 2 Physical Hazard – 0 PPE – User supplied

NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

**3. COMPOSITION AND INFORMATION ON INGREDIENTS**

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
N,N-Dimethylformamide	68-12-2	98-100%	Yes

**4. FIRST-AID MEASURES**

**Inhalation:** Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical aid. **Do not** use mouth-to-mouth resuscitation. If breathing has stopped, apply artificial respiration using oxygen and a suitable mechanical device such as a bag and a mask.

**Ingestion:** Call a poison control center. Do not induce vomiting unless directed by medical personnel. If vomiting occurs naturally, have victim lean forward. Never give anything by mouth to an unconscious person. Get medical aid.

**Skin Contact:** Remove any contaminated clothing. Wash skin with soap or mild detergent and water for at least 15 minutes. Get medical attention.

**Eye Contact:** Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention.

**Notes to Physician:** Treat symptomatically and supportively.

**5. FIRE FIGHTING MEASURES**

**Flammability:** Flammable liquid and vapor (GHS Category 3)

**Auto-ignition Temperature:** 445° C (833° F)

**Flash Point:** 58° C (134° F)

**Flammable Limits:** Lower Limit – 2.2 vol %, Upper Limit – 15.2 vol %

**Products of Combustion:** May decompose into irritating and highly toxic gases under fire conditions (oxides of nitrogen, carbon monoxide, carbon dioxide).

**Specific Fire Hazards:** As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. Vapors may form explosive mixtures with air. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas.

**Specific Explosion Hazards:** No information available.

**Fire Fighting Media:** Water may be ineffective. **Do not** use straight streams of water. For small fires, use dry chemical, carbon dioxide, water spray, or alcohol-resistant foam. For larger fires, use water spray, fog, or alcohol-resistant foam.

**National Fire Protective Association:** Health - 2, Flammability - 2, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

## 6. ACCIDENTAL RELEASE MEASURES

Use water spray to reduce vapors. Water spray may reduce vapors but still not prevent ignition in closed spaces. Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Use spark-proof tools. Provide ventilation to the affected area and remove all ignition sources. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Always use proper personal protective equipment as described in section 8.

## 7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist.

Storage: Keep in a flammables area away from direct sunlight and all sources of ignition and oxidizing materials. Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances.

## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Personal Protection: Wear protective chemical goggles or other appropriate eye protection. Use butyl rubber gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Exposure Limits:

- ACGIH – 100 ppm TWA; Skin – potential significant contribution to overall exposure by the cutaneous route.
- NIOSH – 10 ppm TWA; 30 mg/m<sup>3</sup> TWA; 500 ppm IDLH
- OSHA Final PELs – 10 ppm TWA; 30 mg/m<sup>3</sup> TWA
- OSHA Vacated PELs: 10 ppm TWA; 30 mg/m<sup>3</sup> TWA

## 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.

Odor: Faint amine odor

Odor Threshold: 100 ppm

Molecular Formula: HCON(CH<sub>3</sub>)<sub>2</sub>

Molecular Weight: 73.09

Auto-ignition Temperature: 445° C (833° F)

Flash Point: 58° C (134° F)

Flammable Limits: Lower Limit – 2.2 vol %, Upper Limit – 15.2 vol %

pH: 6-8 @ 20% aqueous solution

Boiling Point: 153° C @ 760 mm Hg

Freezing/Melting Point: -61° C

Decomposition Temperature: Not available

Specific Gravity: 0.94 g/cm<sup>3</sup>

Vapor Density (Air=1): 2.5

Vapor Pressure: 4.9 mbar @ 20° C.

Evaporation Rate (Butyl acetate = 1): 0.17

Viscosity: 0.8 mPas 20° C

Solubility: Soluble

Conductivity: Conductive; Conductivity =  $6 \times 10^6$  pS/m; Dielectric Constant = 36.71; Relaxation Time Constant =  $5.4 \times 10^{-5}$  seconds

## 10. STABILITY AND REACTIVITY

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.

Conditions to Avoid: Ignition sources, excess heat.

Incompatibility With Various Substances: Strong oxidizing agents.

Hazardous Decomposition Products: Irritating and toxic fumes and gases, oxides of nitrogen, carbon monoxide, carbon dioxide.

Hazardous Polymerization: Will not occur.

## 11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact

Acute Exposure Hazards:

INHALATION HAZARD: Causes respiratory tract irritation.

INGESTION HAZARD: Causes gastrointestinal irritation with nausea, vomiting, and diarrhea. May cause liver damage.

SKIN CONTACT HAZARD: Causes skin irritation.

EYE CONTACT HAZARD: Causes eye irritation.

Chronic Exposure Hazards: Repeated or prolonged exposure may cause dermatitis and defatting of skin. Chronic exposure may cause liver damage. May cause fetal effects based on animal studies.

Animal Toxicity:

Inhalation, rat: LC50 = 9-15 mg/l/4H;

Oral, rat: LD50 = 2800 mg/kg;

Skin, rabbit: LD50 = 1500 mg/kg;

Carcinogenicity: IARC Group 3, not classifiable as to its carcinogenicity in humans.

Epidemiology: Considered to be a potent liver toxin. Intolerance to alcohol can occur up to four days after exposure.

Reproductive Effects: May cause congenital malformation in the fetus.

Mutagenicity: Mutation in mammalian somatic cells observed.

Neurotoxicity: No information available.

Other Studies: No information available.

## 12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: Fathead minnow: LC50 = 10400-10800 mg/L/96H;

Fish: Rainbow trout: LC50 = 9800 mg/L/96H;

Fish: Bluegill: LC50 = 6300-7500 mg/L/96H;

Invertebrate: Water flea: EC50 = 8600-13100 mg/L/48H;

Freshwater algae: Green algae: EC50 = >500 mg/L/96H;

Environmental Fate: Readily biodegradable (90%).

## 13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing, use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements.

## 14. TRANSPORT INFORMATION

### US DOT

Proper Shipping Name: N,N-Dimethylformamide

Hazard Class: 3

UN Number: UN2265

Packing Group: III

### IMDG

Proper Shipping Name: N,N-Dimethylformamide

Hazard Class: 3

UN Number: UN2265

Packing Group: III

### IATA

Proper Shipping Name: N,N-Dimethylformamide

Hazard Class: 3

UN Number: UN2265

Packing Group: III

## 15. REGULATORY INFORMATION

### US Federal Regulations:

CERCLA Hazardous Substances: CAS# 68-12-2: 100 lb final RQ, 45.4 kg final RQ

SARA Section 302: Does not have a TPQ

SARA Codes: CAS# 68-12-2 – immediate, fire

Section 313: N,N-Dimethylformamide (68-12-2) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.

Clean Air Act: CAS# 68-12-2 is listed as a hazardous air pollutant (HAP).

OSHA: Not considered highly hazardous by OSHA.

### US State Regulations:

CAS# 68-12-2 is on the following state right-to-know lists: New Jersey, Pennsylvania, and Massachusetts.

California Prop 65: This product contains no chemicals known to the State of California to cause cancer, birth defects, or any other reproductive harm.

## 16. OTHER INFORMATION

Originally Prepared: 1/1/2006

Last Revised: 11/26/2014 – Updated hazard categories, hazard statements, and precautionary statements in Section 2, incompatibility data in Section 10, toxicological data in Section 11, and environmental toxicology in Section 12.

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