

Safety Data Sheet

N, N-Dimethylformamide (DMF)

Section 1 - Chemical Product and Company Identification

SDS Name: N, N-Dimethylformamide

Catalog Numbers: O-913-2B

Company Identification: Transene Company, Inc., DBA ROWLEY BIOCHEMICAL, Inc.
10 ELECTRONICS AVENUE
DANVERS, MA 01923

For information, call: 978-739-4883

Emergency Number: 800-424-9300

For CHEMTREC assistance, call: 800-424-9300

Section 2 - Hazards Identification

GHS Classifications Category

H226-Flammable liquids: 3

H303-Acute toxicity, oral: 5

H312-Acute toxicity, dermal: 4

H319-Serious eye damage/eye irritation: 2A

H331-Acute toxicity, inhalation: 3

H335-Specific target organ toxicity, single exposure; Respiratory tract irritation: 3

H350-Carcinogenicity: 1B

H360-Reproductive toxicity: 1B

H372-Specific target organ toxicity, repeated exposure: 1

Pictogram or Hazard Symbols and Hazard Statement(s):



Signal Word: Danger

Hazard Statements:

H226-Flammable liquid and vapour

H303-May be harmful if swallowed

H312-Harmful in contact with skin

H319-Causes serious eye irritation
 H331-Toxic if inhaled
 H335-May cause respiratory irritation
 H350-May cause cancer
 H360-May damage fertility or the unborn child
 H372-Causes damage to organs through prolonged or repeated exposure (target organs: kidney, eyes, skin, cardiovascular system, liver, and respiratory system)

Precautionary Statements:

P201-Obtain special instructions before use.
 P202-Do not handle until all safety precautions have been read and understood.
 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/vapours/spray.
 P261-Avoid breathing dust/fume/gas/mist/vapours/spray.
 P264-Wash thoroughly after handling.
 P270-Do not eat, drink, or smoke when using this product.
 P271-Use only outdoors or in a well-ventilated area.
 P280-Wear protective gloves/protective clothing/eye protection/face protection.
 P302+P352-If on skin: Wash with plenty of soap and water.
 P301+P312-If swallowed: Call a Poison Center/doctor if you feel unwell.
 P303+P361+P353-If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
 P304+P340-If inhaled: Remove person to fresh air and keep comfortable for breathing.
 P305+P351+P338-If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P308+P313-If exposed or concerned: Get medical advice/attention.
 P311-Call a Poison Center/doctor.
 P312-Call a Poison Center/doctor if you feel unwell.
 P314-Get medical advice/attention if you feel unwell.
 P337+P313-If eye irritation persists: Get medical advice/attention.
 P362+P364-Take off contaminated clothing and wash it before reuse.
 P370+P378-In case of fire: Use dry chemical, carbon dioxide, dry sand, water spray, or alcohol-resistant foam to extinguish.
 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.
 P501-Dispose of contents/container in accordance with local/regional/national/international regulations.

Section 3 - Composition, Information on Ingredients

| CAS# | Chemical Name | Percent |
|---------|-----------------------|---------|
| 68-12-2 | N,N-Dimethylformamide | ≥99 |

Section 4 - First Aid Measures

Eye Exposure: In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Seek immediate medical attention.

Dermal Exposure: In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Seek medical advice.

Oral Exposure: If swallowed, seek immediate medical advice. Do NOT induce vomiting.

Inhalation Exposure: If inhaled, remove to fresh air. Seek immediate medical attention.

Section 5 - Fire Fighting Measures

General Information: Containers can build up pressure if exposed to heat and/or fire. As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Use water spray to keep fire-exposed containers cool. Containers may explode in the heat of a fire.

Extinguishing Media: Use dry chemical, carbon dioxide, dry sand, water spray or alcohol-resistant foam. Use water spray to cool fire-exposed unopened containers. Do NOT use straight streams of water.

Hazardous Combustion Products: Carbon oxides, nitrogen oxides, dimethylamine, irritating and toxic fumes and gases.

Flash Point: 57.5°C (135.5°F) Closed Cup

Autoignition Temperature: 435°C (815°F) at 1,013 hPa

Explosion Limits, Lower: 2.2 vol %

Upper: 16 vol %

NFPA Rating: (estimated) Health: 2; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

Procedure(s) of Personal Precaution(s):

Wear personal protective equipment. Do not ingest or inhale. Do not get on skin or clothing. Do not get in eyes. Ensure adequate ventilation. Keep away from heat. Eliminate all sources of ignition. Take precautionary measures against static discharges.

Methods for Cleaning up: Absorb with inert material such as sand, earth, or vermiculite. Carefully sweep up and containerize for proper disposal. Use spark-proof tools and explosion-proof equipment. Do not release to the environment. Do not release to drains.

Section 7 - Handling and Storage

Use care when handling. Wash thoroughly after handling. Wear personal protective equipment. Use only under a chemical fume hood. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Do not ingest or inhale vapors. Keep in a tightly closed container. Store in a cool, dry, and well-ventilated area. Keep away from incompatible materials, ignition sources, or open flame. Protect from heat. Use only non-sparking tools. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Section 8 - Exposure Controls, Personal Protection

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

Personal Protective Equipment

Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin: Wear appropriate protective gloves to prevent skin exposure.

Clothing: Wear appropriate protective clothing to prevent skin exposure.

Respirators: A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant a respirator's use.

Exposure Limits:

| Chemical Name | ACGIH - TLV | NIOSH - IDLH | OSHA - Final PELs |
|--------------------------------------|----------------|--|--|
| N,N-Dimethylformamide CAS#68-12-2 | 5 ppm Skin TWA | 10 ppm TWA 30 mg/m ³ TWA 500 ppm IDLH | 10 ppm TWA 30 mg/m ³ TWA |

OSHA Vacated PELs: N,N-Dimethylformamide: 10 ppm TWA; 30 mg/m³ Skin TWA

Section 9 - Physical and Chemical Properties

Physical State: Liquid

Appearance: Clear, colorless

Odor: Amine-like

Vapor Pressure: 3.77 hPa at 20°C (68°F)

Odor Threshold: 0.329 ppm
Vapor Density: 2.52 (Air=1.0)
pH: 7 at 200 g/L at 20°C (68°F)
Relative Density: Not available
Melting point/freezing point: -61°C (-78°F)
Solubility: Miscible with water
Boiling Point: 153°C (307°F)
Flash Point: 57.5°C (135.5°F) Closed Cup
Evaporation Rate: 0.17
Flammability (solid, gas): Not applicable
Partition coefficient: n-octanol/water: log Pow: -0.85 at 25°C (77°F)
Autoignition Temperature: 435°C (815°F) at 1,013 hPa
Decomposition Temperature: >350°C (>662°F)
Viscosity: 0.8 mPa.s at 20°C (68°F)
Specific Gravity/Density: 0.944 g/mL

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.

Conditions to Avoid: Incompatible materials, heat, flame, sparks, hot surfaces, sources of ignition, and excess heat.

Incompatibilities with Other Materials: Strong oxidizing agents, halogens, halogenated compounds, reducing agents, alkali metals, nitrates, oxides, isocyanates, hydrides, phosphorus oxides, iron, tin, copper, copper alloys, azides, potassium permanganate, chromium(VI) oxide, chlorates, triethylaluminum.

Hazardous Decomposition Products: Carbon oxides, nitrogen oxides, dimethylamine, irritating and toxic fumes and gases.

Section 11 - Toxicological Information

CAS#68-12-2 N,N-Dimethylformamide: RTECS#: LQ2100000

LD50 Oral: 2800 mg/kg (rat)

LD50 Dermal: 1500 mg/kg (rabbit)

LC50 Inhalation: 9400 mg/m³ 2h (mouse)

Tumorigen, mutagen, and reproductive effector per RTECS.

Carcinogenicity: N,N-Dimethylformamide CAS#68-12-2 is not listed by NTP, or OSHA. N,N-Dimethylformamide is listed by IARC (Group 2A, Probably Carcinogenic to Humans), ACGIH (A3, Animal Carcinogen), and California Prop. 65 as a carcinogen.

Information on the likely routes of exposure: Routes of entry anticipated: oral, dermal, inhalation, and eye.

Epidemiology: Not available.

Teratogenicity: Teratogenic effects have occurred in experimental animals.

Reproductive Effects: Experiments have shown reproductive toxicity on laboratory animals. Reproductive effector per RTECS.

Developmental Effects: May damage the unborn child. Developmental effects have occurred in experimental animals.

Neurotoxicity: Not available.

Mutagenicity: Mutagen per RTECS.

Specific Target Organ Toxicity, Single Exposure: Respiratory system and central nervous system.

Specific Target Organ Toxicity, Repeated Exposure: Kidney, eyes, skin, cardiovascular system, liver, and respiratory system.

Symptoms associated with exposure: Symptoms of exposure may include headache, dizziness, drowsiness, tiredness, coughing, wheezing, nausea, diarrhea, abdominal pain, vomiting, difficulty breathing, alcohol intolerance, jaundice, rashes. Causes damage to organs through prolonged or repeated exposure. Contact with skin may cause irritation, dermatitis. Contact with eyes may cause serious irritation, redness, tearing, and sensation of burning.

Note: Intolerance for alcohol can occur up to 4 days after N,N-Dimethylformamide exposure. N,N-Dimethylformamide is considered to be a potent liver toxin.

The toxicological properties of this material have not been thoroughly investigated.

Section 12 - Ecological Information

Ecotoxicity: Do not release to the environment. Do not release to drains.

CAS#68-12-2 N,N-Dimethylformamide:

LC50, freshwater fish: 7100 mg/L 96h flow-through (*lepomis macrochirus*)(bluegill sunfish)

LC50, freshwater fish: 9800 mg/L 96h (*oncorhynchus mykiss*)(rainbow trout)

ErC50, algae: >1000 mg/L 72h static (*desmodesmus subspicatus*)(green algae)

EC50, water flea: 13100 mg/L 48h static (*daphnia magna*)

EC50, bacteria: 12300-17500 mg/L 5min static (*vibrio fischeri*)

Persistence and degradability: Persistence is unlikely, will likely degrade over time.

Bio-accumulative potential: Does not significantly accumulate in organisms.

Mobility: Will likely be mobile in the environment due to its water solubility.

Section 13 - Disposal Considerations

DISPOSAL: Dispose of in accordance with all federal, state, and local regulations.

Section 14 - Transport Information

DOT

Proper shipping name: N,N-Dimethylformamide
UN2265
PG III
Hazard class 3 (flammable)

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| Section 15 - Regulatory Information |
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Canada Regulatory Information

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the SDS contains all the information required by the CPR.

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| Section 16 - Additional Information |
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SDS Creation Date: 2-2-12

Revision #1: 2-26-14 YM

Revision #2: 4-13-17

Revision #3: 4-4-22

Revision #4: 5-17-24

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