

Material Safety Data Sheet

HAZARD WARNINGS	RISK PHRASES	PROTECTIVE CLOTHING
	Combustible material; avoid heat and sources of ignition. Irritating to skin, eyes, and the respiratory system. Teratogen. POSSIBLE CARCINOGEN. MINIMIZE EXPOSURE. Hygroscopic -- keep container tightly sealed.	

Section I. Chemical Product and Company Identification

Chemical Name	N,N-Dimethylformamide		
Catalog Number	D0722	Supplier	TCl America 9211 N. Harborage St. Portland OR 1-800-423-8616
Synonym	Formyldimethylamine		
Chemical Formula	HCON(CH ₃) ₂		
CAS Number	68-12-2	In case of Emergency Call	Chemtrec® (800) 424-9300 (U.S.) (703) 527-3887 (International)

Section II. Composition and Information on Ingredients

Chemical Name	CAS Number	Percent (%)	TLV/PEL	Toxicology Data
N,N-Dimethylformamide	68-12-2	Min. 99.5 (GC)	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.	Rat LD ₅₀ (oral) 4000mg/kg Rat LD ₅₀ (inhalation) 3421ppm/1H Rabbit LD ₅₀ (dermal) 4720mg/kg

Section III. Hazards Identification

Acute Health Effects	Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.
Chronic Health Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY: Reproductive Effects: Rat TClO (inhalation) 287 ppm/6 hours, Female 0-19 Days of pregnancy. Toxic Effects: Effects on Fertility - Post-implantation mortality Effects on Embryo or Fetus - Extra embryonic structures Effects on Embryo or Fetus - Fetotoxicity Rat TClO (inhalation) 800 ppm/6 hours, female 13 weeks prior to mating. Toxic Effects: Maternal Effects - Other effects Endocrine - Effect on menstrual cycle Rat TClO (inhalation) 50 ppm/6 hours, male 13 weeks prior to mating. Toxic Effects: Paternal Effects - Spermatogenesis Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.

Section IV. 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. Get medical attention.
Skin Contact	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.
Inhalation	If the victim is not breathing, perform mouth-to-mouth resuscitation. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, oxygen can be administered. Seek medical attention if respiration problems do not improve.
Ingestion	INDUCE VOMITING by sticking finger in throat. Lower the head so that the vomit will not reenter the mouth and throat. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive.

Section V. Fire and Explosion Data

Flammability	Combustible.	Auto-Ignition	Not available.
Flash Points	58°C (136.4°F). (CC) 67°C (152.6°F). (OC)	Flammable Limits	LOWER: 2.2% UPPER: 15.2%
Combustion Products	These products are toxic carbon oxides (CO, CO ₂), nitrogen oxides (NO, NO ₂).		
Fire Hazards	Not available.		
Explosion Hazards	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.		
Fire Fighting Media and Instructions	Combustible liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build-up, autoignition or explosion. Consult with local fire authorities before attempting large scale fire-fighting operations.		

Section VI. Accidental Release Measures

Spill Cleanup Instructions	Combustible liquid. Irritating material. Teratogenic material. Possible carcinogenic material. Hygroscopic material. Keep away from heat. Mechanical exhaust required. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. DO NOT touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Consult federal, state, and/or local authorities for assistance on disposal.
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Section VII. Handling and Storage

Handling and Storage Information	COMBUSTIBLE. IRRITANT. TERATOGEN. POSSIBLE CARCINOGEN. HYGROSCOPIC. Keep away from heat. Mechanical exhaust required. Avoid excessive heat and light. Do not breathe gas/fumes/vapor/spray. Always store away from incompatible compounds such as oxidizing agents, reducing agents, alkalis (bases).
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Section VIII. 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 station and safety shower is proximal to the work-station location.
Personal Protection	Splash goggles. Lab coat. Vapor respirator. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product. Be sure to use a MSHA/NIOSH approved respirator or equivalent.
	
Exposure Limits	This chemical is classified as a possible carcinogen. There is no acceptable exposure limit for a carcinogen.

Section IX. Physical and Chemical Properties

Physical state @ 20°C	Liquid. (Clear, colorless.)	Solubility	Miscible with water and many organic solvents.
Specific Gravity	0.95 (water=1)		
Molecular Weight	73.09	Partition Coefficient	Log P _{ow} : 0.87
Boiling Point	153°C (307.4°F)	Vapor Pressure	3mm Hg (@ 20°C)
Melting Point	-61°C (-77.8°F)	Vapor Density	2.5 (Air = 1)
Refractive Index	1.42803	Volatility	Not available.
Critical Temperature	Not available.	Odor	Amine like. (Slight.)
Viscosity	Not available.	Taste	Not available.

Section X. Stability and Reactivity Data

Stability	This material is stable if stored under proper conditions. (See Section VII for instructions)
Conditions of Instability	Avoid excessive heat and light.
Incompatibilities	Reactive with strong oxidizing agents, reducing agents, alkalis (bases), acid chlorides, halogens, and alkali metals.

Section XI. Toxicological Information	
RTECS Number	LQ2100000
Routes of Exposure	Eye Contact. Ingestion. Inhalation.
Toxicity Data	Rat LD ₅₀ (oral) 4000mg/kg Rat LD ₅₀ (inhalation) 3421ppm/1H Rabbit LD ₅₀ (dermal) 4720mg/kg
Chronic Toxic Effects	CARCINOGENIC EFFECTS : Not available. MUTAGENIC EFFECTS : Not available. TERATOGENIC EFFECTS : Not available. DEVELOPMENTAL TOXICITY : Reproductive Effects: Rat TCLo (inhalation) 287 ppm/6 hours, Female 0-19 Days of pregnancy. Toxic Effects: Effects on Fertility - Post-implantation mortality Effects on Embryo or Fetus - Extra embryonic structures Effects on Embryo or Fetus - Fetotoxicity Rat TCLo (inhalation) 800 ppm/6 hours, female 13 weeks prior to mating. Toxic Effects: Maternal Effects - Other effects Endocrine - Effect on menstrual cycle Rat TCLo (inhalation) 50 ppm/6 hours, male 13 weeks prior to mating. Toxic Effects: Paternal Effects - Spermatogenesis Repeated or prolonged exposure to this compound is not known to aggravate existing medical conditions.
Acute Toxic Effects	Irritating to eyes and skin on contact. Inhalation causes irritation of the lungs and respiratory system. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering. Follow safe industrial hygiene practices and always wear proper protective equipment when handling this compound.

Section XII. Ecological Information	
Ecotoxicity	Not available.
Environmental Fate	Dimethylformamide's production and use as a solvent may result in its release to the environment through various waste streams. If released to air, a vapor pressure of 3.9 mm Hg at 25 deg C indicates dimethylformamide will exist solely as a vapor in the ambient atmosphere. Vapor-phase dimethylformamide will be degraded in the atmosphere by reaction with photochemically-produced hydroxyl radicals; the half-life for this reaction in air is estimated to be 22 hours. If released to soil, dimethylformamide is expected to have very high mobility based upon an estimated Koc of 7. Volatilization from moist soil surfaces is not expected to be an important fate process based upon a Henry's Law constant of 7.4X10 ⁻⁸ atm-cu m/mole. Dimethylformamide may volatilize from dry soil surfaces based upon its vapor pressure. If released into water, dimethylformamide is not expected to adsorb to suspended solids and sediment based upon the estimated Koc. An aerobic unacclimated and acclimated river die-away test showed that dimethylformamide at an initial concn of 30 mg/l completely disappeared within 6 and 3 days, respectively. Thus, dimethylformamide is expected to rapidly degrade in the environment. Volatilization from water surfaces is not expected to be an important fate process based upon this compound's Henry's Law constant. An estimated BCF of 3 suggests the potential for bioconcentration in aquatic organisms is low. Hydrolysis is not expected to occur due to the slow rate of reaction for amide functional groups. Occupational exposure to dimethylformamide may occur through inhalation and dermal contact with this compound at workplaces where dimethylformamide is produced or used. Monitoring data indicate that the general population may be exposed to dimethylformamide via dermal contact with consumer products containing dimethylformamide.

Section XIII. Disposal Considerations	
Waste Disposal	Recycle to process, if possible. Consult your local regional authorities. You may be able to dissolve or mix material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber system. Observe all federal, state and local regulations when disposing of the substance.

Section XIV. Transport Information	
DOT Classification	DOT CLASS 3: Flammable liquid.
PIN Number	UN2265
Proper Shipping Name	N,N-Dimethylformamide
Packing Group (PG)	III
DOT Pictograms	

Section XV. Other Regulatory Information and Pictograms

TSCA Chemical Inventory (EPA)	This compound is ON the EPA Toxic Substances Control Act (TSCA) inventory list.
WHMIS Classification (Canada)	CLASS B-3: Combustible liquid with a flash point between 37.8 °C (100 °F) and 93.3 °C (200 °F). On DSL.
EINECS Number (EEC)	200-679-5
EEC Risk Statements	R36/37/38- Irritating to eyes, respiratory system and skin. R45- May cause cancer.
Japanese Regulatory Data	ENCS No. 2-680

Section XVI. Other Information

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Notice to Reader

TCI laboratory chemicals are for research purposes only and are NOT intended for use as drugs, food additives, households, or pesticides. The information herein is believed to be correct, but does not claim to be all inclusive and should be used only as a guide. Neither the above named supplier nor any of its subsidiaries assumes any liability whatsoever for the accuracy or completeness of the information contained herein. Final determination of suitability of any material is the sole responsibility of the user. All chemical reagents must be handled with the recognition that their chemical, physiological, toxicological, and hazardous properties have not been fully investigated or determined. All chemical reagents should be handled only by individuals who are familiar with their potential hazards and who have been fully trained in proper safety, laboratory, and chemical handling procedures. Although certain hazards are described herein, we can not guarantee that these are the only hazards which exist. Our MSDS sheets are based only on data available at the time of shipping and are subject to change without notice as new information is obtained. Avoid long storage periods since the product is subject to degradation with age and may become more dangerous or hazardous. It is the responsibility of the user to request updated MSDS sheets for products that are stored for extended periods. Disposal of unused product must be undertaken by qualified personnel who are knowledgeable in all applicable regulations and follow all pertinent safety precautions including the use of appropriate protective equipment (e.g. protective goggles, protective clothing, breathing equipment, facial mask, fume hood). For proper handling and disposal, always comply with federal, state, and local regulations.