

CORCO CHEMICAL CORPORATION

Manufacturers of ACS Reagents and Semiconductor Grade Chemicals

SAFETY DATA SHEET

N, N-DIMETHYLFORMAMIDE

1. IDENTIFICATION

Product identifier: N, N-DIMETHYLFORMAMIDE

Product Code Number:

Company Identification:

Corco Chemical Corporation
299 Cedar Lane
Fairless Hills, PA 19030
Phone: 215-295-5006
Fax: 215-295-0781

24 Hour Emergency Telephone
Number:

CHEMTREC (U.S.): 1-800-424-9300
CHEMTREC (Outside U.S. 1-703-527-3887)

Trade Name:

N, N-Dimethylformamide

Synonyms:

Formyldimethylamine; Formamide, DMF

Chemical Formula:

HCON(CH₃)₂

Product use: Solvent, Laboratory and
scientific research and development

2. HAZARD(S) IDENTIFICATION

Hazard classification:

Physical hazards:

Flammable liquids

Category 3

Health hazards:

Acute toxicity (Inhalation - vapor)

Category 4

Serious eye damage/eye irritation

Category 2A

Toxic to reproduction

Category 1B

Specific target organ toxicity - single
exposure

Category 3

Specific target organ toxicity
repeated exposure

Category 1

Environmental hazards:

Acute hazards to the aquatic environment

Category 3

Hazard Statements: Flammable liquid and vapor. Harmful if inhaled. Causes serious eye irritation. May damage fertility or the unborn child. May cause respiratory irritation. May cause drowsiness or dizziness. Causes damage to organs through prolonged or repeated exposure. Harmful to aquatic life.

Precautionary Statements: Keep away from heat/sparks/open flames/hot surfaces – No smoking. Wear protective gloves/protective clothing/eye protection/face protection. If on skin or hair: Remove/take off immediately all contaminated clothing. Rinse skin with water/shower.

Response: IF INHALED: Remove person to fresh air and keep comfortable for breathing. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. Call a POISON CENTER/doctor if you feel unwell.

Storage: Store in well-ventilated place. Keep cool. Store locked up. Keep container tightly closed.

Disposal: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Label Elements:



Signal word **Danger**

3. Composition/information on ingredients

<u>Ingredient</u>	<u>CAS No</u>	<u>Percent</u>	<u>Hazardous</u>
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

Extinguishing media:

Suitable extinguishing media: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special hazards arising from the substance or mixture: Carbon oxides, nitrogen oxides (NOx)

Advice for firefighters: Wear self contained breathing apparatus for fire fighting if necessary.

Additional information: Use water spray to cool unopened containers.

Flammability:	Flammable liquid and vapor (GHS Category 3)
Auto-ignition Temperature:	445o C (833o F)
Flash Point:	58o C (134o F)
Flammable Limits:	
Lower Limit:	2.2 vol %
Upper Limit	15.2 vol %

National Fire Protective Association: Health- 1, 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

Personal precautions, protective equipment and emergency procedures:

ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Keep unauthorized personnel away. Keep upwind. Use personal protective equipment. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ventilate closed spaces before entering them. See Section 8 of the MSDS for Personal Protective Equipment.

Methods and material for containment and cleaning up:

Eliminate all ignition sources if safe to do so. Take precautionary measures against static discharges. Stop leak if possible without any risk. Use only non-sparking tools. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. Dike far ahead of larger spill for later recovery and disposal.

Notification Procedures: Prevent entry into waterways, sewer, basements or confined areas. Inform authorities if large amounts are involved.

Environmental precautions: Do not contaminate water sources or sewer. Prevent further leakage or spillage if safe to do so.

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. DMF is moisture sensitive.

8. Exposure controls/personal protection

Exposure Limits:

ACGIH – 100 ppm TWA; Skin – potential significant contribution to overall exposure by the cutaneous route.

NIOSH – 10 ppm TWA; 30 mg/m³ TWA; 500 ppm IDLH

OSHA Final PELs – 10 ppm TWA; 30 mg/m³ TWA

OSHA Vacated PELs: 10 ppm TWA; 30 mg/m³ TWA

Individual protection measures/equipment:

Eye/face protection: Wear safety glasses with side shields (or goggles). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and Hand protection: Wear protective nitrile rubber gloves.

Respiratory protection: In case of inadequate ventilation use suitable respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hygiene measures: Provide eyewash station and safety shower. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance:	
Physical state:	Liquid
Form:	Liquid
Color:	Colorless
Odor:	Pungent, Amine-like odor
Odor threshold:	No data available
pH:	6.7 0.5 molar aqueous solution
Melting point/freezing point:	-61 °C
Initial boiling point and boiling range:	153 °C (101.3 kPa)
Flash Point:	58 °C (Closed Cup)
Evaporation rate:	No data available
Flammability (solid, gas):	Class II Combustible Liquid
Flammability limit - upper (%):	15.2 %(V)
Flammability limit - lower (%):	2.2 %(V)
Explosive limit - upper (%):	No data available
Explosive limit - lower (%):	No data available
Vapor pressure:	0.50 kPa (25 °C)
Vapor density:	2.51 AIR=1
Relative density:	0.95 (20 °C) 4 °C
Solubility:	Miscible with water
Partition coefficient (n-octanol/water):	-1.01
Auto-ignition temperature:	445 °C
Decomposition temperature:	> 350 °C Temperatures >350°C may cause decomp to form dimethylamine and carbon dioxide, with pressure developing in closed containers.
Molecular weight:	73.09 g/mol (C ₃ H ₇ NO)
Viscosity:	No data available

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 and direct sunlight. Avoid moisture. Heat, flames and sparks.

Incompatibility With Various Substances: Strong oxidizing agents, ammonia, anhydrides, iron, phenols, isocyanates, acids (mineral non-oxidizing e.g. hydrochloric acid, hydrofluoric acid, muriatic acid, phosphoric acid), acid (mineral oxidizing e.g. chromic acid, hypochlorous acid, nitric acid, sulfuric acid), metals

(alkali and alkaline e.g. cesium, potassium, sodium), metals and metal compounds (toxic e.g. beryllium, lead acetate, nickel carbonyl, tetraethyl lead), reducing agents (strong e.g. aluminum carbide, chlorosilane, hydrogen phosphide, lithium hydride), carbon tetrachloride, chlorinated hydrocarbons, organic materials.

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, and 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, mouse: LC50 = 9400 mg/m³/2H;

Inhalation, rat: LC50 = 3421 ppm/1H;

Inhalation, rat: LC50 = 3421 ppm/3H;

Inhalation, rat: LC50 = 948 ppm/3H;

Oral, mouse: LD50 = 2900 mg/kg;

Oral, rabbit: LD50 = 5 g/kg;

Oral, rat: LD50 = 2800 mg/kg;

Skin, rabbit: LD50 = 4720 mg/kg;

Skin, rat: LD50 = 3 g/kg;

Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65

Epidemiology: No information available.

Reproductive Effects: Effects have been observed in experimental animals.

Mutagenicity: Effects have been observed in experimental animals.

Neurotoxicity: No information available.

Other Studies: No information available.

Specific target organ toxicity - single exposure: Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure: no data available

12. ECOLOGICAL INFORMATION

Ecotoxicity:

Fish: *Pimephales promelas*: LC50 = 10.6 g/L/96H;
Fish: *Onchorhynchus mykiss*: LC50 = 9.8 g/L/96H;
Fish: *Lepomis macrochirus*: LC50 = 6.3 g/L/96H;
Water flea: EC50 = 7500 mg/L/48H;
Freshwater algae: EC50 = 7500 mg/L/96H;

Mobility in soil: The product is partly soluble in water. May spread in the aquatic environment.

13. Disposal considerations

General information: This product is highly flammable. Don't use fire to cut empty container after use.

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.

Contaminated packaging: Since emptied containers retain product residue, follow label warnings even after container is emptied.

14. Transportation Information

Proper Shipping Name: N,N-Dimethylformamide
Hazard Class: 3
UN Number: UN2265
Packing Group: III

US DOT, IATA, IMDG



15. Regulatory information

US federal regulations:

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050):

None present or none present in regulated quantities.

CERCLA Hazardous Substance List (40 CFR 302.4):

DIMETHYLFORMAMIDE Reportable quantity: 100 lbs.

Superfund amendments and reauthorization act of 1986 (SARA)

Hazard categories:

Acute (Immediate): Yes

Chronic (Delayed): Yes

Fire: Yes

Reactive: No

Pressure Generating: No

SARA Section 302: Does not have a TPQ

SARA 304 Emergency release notification: DIMETHYLFORMAMIDE – 100 lbs.

SARA 311/312 Hazardous chemical: DIMETHYLFORMAMIDE – 500 lbs.

SARA 313 (TRI reporting) 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: Reporting threshold for other users: 1000 lbs.

Reporting threshold for manufacturing and processing: 25,000 lbs.

Clean Air Act: CAS# 68-12-2 is listed as a hazardous air pollutant (HAP). It is not a Class 1 Ozone Depleter. It is not a Class 2 Ozone Depleter.

Clean Water Act: CAS# 68-12-2 is not listed as a Hazardous Substance. It is not a Priority Pollutant. It is not a Toxic Pollutant.

OSHA: Not considered highly hazardous by OSHA.

US State Regulations:

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

US. California Proposition 65: No ingredient regulated by CA Prop 65 present.

16. Other information

Disclaimer - The information in the sheet was written based on the best knowledge and experience currently available. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.