

DIMETHYLFORMAMIDE**PRODUCT IDENTIFICATION****Chemical Name and Synonyms:***N,N-Dimethylformamide***Chemical Family:***Amide***Chemical Formula:***HCON(CH₃)₂***Product Use:***Laboratory solvent***Manufacturer's Name and Address:***Caledon Laboratories Ltd.**40 Armstrong Avenue**Georgetown, Ontario L7G 4R9***Telephone No:***(905) 877-0101***Fax No:***(905) 877-6666***Emergency Telephone No:***CANUTEC (613) 996-6666***HAZARDOUS INGREDIENTS OF MATERIALS**

Ingredients	%	TLV Units	CAS No.
<i>N,N-Dimethylformamide</i>	<i>99</i>	<i>10 ppm</i>	<i>68-12-2</i>

PHYSICAL DATA**Physical State:***Liquid***Odour and Appearance:***Clear liquid; fishy, pungent odour***Odour Threshold (ppm):***0.046 ppm (good warning properties, detectable well below the TLV)***Vapour Pressure (mm Hg):***2.7 mm Hg at 20°C***Vapour Density (Air = 1):***2.51***Evaporation Rate:***0.17 (n-Butyl acetate = 1)***Boiling Point (°C):***153°C***Freezing Point (°C):***-61°C***pH:***6.7 (0.5M, aqueous)***Specific Gravity:***0.95***Coefficient of Water/Oil distribution:***log P(oct)=-0.87***SHIPPING DESCRIPTION****UN:***2265***T.D.G. Class:***3***Pkg. Group:***III***REACTIVITY DATA****Chemical Stability:***Normally stable.***Incompatibility with other substances:***Can react vigorously with acid chlorides, oxidizing agents, chloroformates, reducing agents, halogens. Explosive with triethylaluminum when heated. Reacts violently with carbon**tetrachloride or benzene hexachloride above 65°C, or in the presence of iron, and with such oxidizing agents as chromic anhydride, magnesium nitrate, potassium permanganate, bromine, nitric acid. Methylene bisphenyl diisocyanate polymerizes violently on contact with dimethylformamide. Not corrosive to metals.***Reactivity:***Avoid elevated temperatures, sparks, open flame, all ignition sources, and incompatible materials.***Hazardous Decomposition Products:***CO_x, NO_x***FIRE AND EXPLOSION DATA****Flammability:***Combustible liquid. Must be moderately heated for combustion to occur.***Extinguishing Media:***Carbon dioxide, alcohol foam, or dry chemical. Do not use halogenated extinguishing material. Water spray can be used to absorb heat, disperse vapours, cool containers, but is ineffective for extinguishing fire. Fight fire from upwind, from a safe distance. Firefighters must wear protective equipment and clothing (Bunker gear) sufficient to prevent inhalation of fumes or vapours and contact with skin and eyes.***Flash Point (Method Used):***58°C (CC)***Autoignition Temperature:***445°C***Upper Flammable Limit (% by volume):***15.2***Lower Flammable Limit (% by volume):***2.2***Hazardous Combustion Products:***CO_x, NO_x, dimethyl- amine***Sensitivity to Impact:***None identified***Sensitivity to Static discharge:***No information available; vapour in the flammable range may be ignited by a electrostatic charge of sufficient energy.***TOXICOLOGICAL PROPERTIES AND HEALTH DATA****Toxicological Data:****LD₅₀:***(oral, rat) 2,800 mg/kg; (dermal, rabbit) 5,000 mg/kg***LC₅₀:***(inh, mouse) 3,092 ppm/2h***Effects of Acute Exposure to Product:****Inhaled:***Irritating; may cause coughing, sneezing, and shortness of breath. Readily absorbed through respiratory tract, causing gastrointestinal complications, colicky abdominal pains, loss of appetite, nausea, vomiting, nervous agitation, increased blood pressure, liver damage, damage to kidneys and urinary tract.***In contact with skin:***Mild irritant to skin and tissue. May cause drying and cracking of skin. May be absorbed through skin in toxic amounts, causing systemic symptoms as in "Inhaled" or "Ingested".***In contact with eyes:***Vapour can cause mild irritation. Liquid can cause temporary, moderate conjunctival inflammation and transient corneal damage.***Ingested:**

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No specific information on ingestion. Would probably cause irritation, with stomach pain, nausea, vomiting, diarrhea. A potent liver toxin. Intolerance for alcohol can occur up to 4 days after exposure.

Effects of Chronic Exposure to Product:

Liver damage has been reported in workers exposed to DMF, probably at 20 ppm or higher. Liver damage is usually reversible if exposure is controlled. Symptoms include nausea, vomiting, alcohol intolerance (flushing, severe headache, dizziness after moderate consumption). Long-term exposure of animals to levels of 100 to 200 ppm, by inhalation or ingestion, has produced liver and kidney damage. Prolonged exposure to concentrations of 2,000 ppm can cause death.

Carcinogenicity:

Classified A4, not classifiable as human and/or animal carcinogen.

Teratogenicity:

Effects in animal testing. No human information available.

Reproductive Effects:

Effects in animal testing. No human information available.

Mutagenicity:

Some effects in humans

Synergistic Products:

Interacts severely with alcohols.

PREVENTIVE MEASURES

Engineering Controls:

Non-sparking, grounded exhaust ventilation, separate from other ventilation systems.

Respiratory Protection:

Use only in chemical fume hood. Up to 100 ppm: NIOSH/OSHA approved supplied-air respirator. Up to 250 ppm: continuous-flow supplied-air respirator. Up to 500 ppm: continuous-flow supplied-air respirator with tight-fitting face-piece, or full face-piece self-contained breathing apparatus. For higher or unknown concentrations, as in fire or spill conditions: positive pressure, full face-piece self-contained breathing apparatus, or positive-pressure, full face-piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus.

Eye Protection:

Chemical goggles and/or face shield.

Skin Protection:

Impervious gloves, butyl rubber, Viton™/butyl rubber, Barrier (PE/PA/PE), Silver Shield/4H™ (polyethylene/ethylene vinyl alcohol), Responder™, Trelchem™HPS, Tychem™BR/LV, Tychem™TK. Other protective clothing, apron, coveralls, boots, sufficient to prevent contact

Other Personal Protective Equipment:

Safety shower and eye wash in work area.

Leak and Spill Procedure:

Evacuate area. Eliminate all sources of ignition. Cleanup personnel must be thoroughly trained in the hazards of this chemical and must wear protective equipment and clothing sufficient to prevent inhalation or contact with skin and eyes. Stop or reduce leak if safe to do so. Surround and cover the spilled material with inert absorbant. Do not touch spilled material. Do not breathe the mist or vapours. Prevent from entering sewers or waterways. Collect contaminated material and place in suitable, labelled containers for disposal.

Contaminated absorbent may pose the same hazards as the chemical; treat with caution. Wash area of spill thoroughly with copious amounts of water.

Waste Disposal:

Follow all federal, provincial, and local regulations.

Handling Procedures and Equipment:

COMBUSTIBLE, TOXIC. Workers handling this material must be thoroughly trained in its hazards and its safe use, and must wear appropriate protective equipment and clothing. Keep away from all ignition sources. Ground and bond equipment and containers to prevent a static charge buildup, use spark-resistant tools, and avoid splash filling of containers. Avoid generating mists or vapours. Use the smallest amount possible for the purpose, in well-ventilated areas. Keep work area free of incompatible substances and extraneous materials, particularly those which can burn. Do not return contaminated material to the original containers. Keep containers closed when not in use. Empty containers may contain hazardous residues; treat with caution.

Storage Requirements:

Store in suitable, labelled containers, in a cool, dry, well-ventilated place, out of direct sunlight, and away from ignition sources and incompatible materials. Keep air out of container. Keep container tightly closed when not in use and when empty. Protect from damage, and inspect frequently for signs of leaking. Storage facilities should be made of fire-resistant materials and should have raised sills or ramps, with trenching to a safe area.

FIRST AID MEASURES

Specific Measures:

Eyes:

IMMEDIATELY flush eyes with warm running water for at least twenty (20) minutes, holding eyelids open while flushing. If irritation persists, get medical advice immediately.

Skin:

Remove contaminated clothing (including rings, watches, belts, and shoes). IMMEDIATELY flush exposed area with large amounts of warm running water for at least twenty (20) minutes. Wear gloves to avoid contact. If irritation persists, get medical advice immediately. Decontaminate clothing, shoes and leather goods before reuse, or discard.

Inhalation:

IMMEDIATELY remove to fresh air (caution must be used by rescuers to avoid exposure to contaminating fumes). Give oxygen and get medical attention for breathing difficulty.

Ingestion:

Do not induce vomiting. If the casualty is alert and not convulsing have them drink 1 to 2 glasses of water to dilute the material. Obtain medical attention immediately. If spontaneous vomiting occurs, have casualty lean forward to avoid breathing in of emesis. Rinse mouth and administer more water.

REFERENCES USED

CCINFO disc: Cheminfo

Royal Society of Chemistry: Chemical Safety Data Sheets, Vol. 1, 1992

Budavari: The Merck Index, 12th ed., 1997

Sax, Lewis: Hawley's Condensed Chemical Dictionary, 11th ed., 1987

Sax: Dangerous Properties of Industrial Materials, 5th ed., 1979
Suppliers' Material Safety Data Sheets

ADDITIONAL INFORMATION

Date Issued:

November 1, 1988

Revision:

February 2012

MSDS:

DIMETHYLFORMAMIDE

3800-1, 3800-3, 3801-2, 3802-2, 3803-2, CAL 1341

Proposed WHMIS Designation:

B3; D2A; D2B

Prepared by: Caledon Laboratories Ltd. (905)

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