N,N-Dimethylaniline



Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

N,N-Dimethylaniline

STATEMENT OF HAZARDOUS NATURE

CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.



SUPPLIER

Santa Cruz Biotechnology, Inc. 2145 Delaware Avenue Santa Cruz, California 95060 800.457.3801 or 831.457.3800 **EMERGENCY:** ChemWatch Within the US & Canada: 877-715-9305 Outside the US & Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

SYNONYMS

C8-H11-N, C6-H5-N(CH3)2, dimethylaniline, "N, N-dimethyl aniline", "N, N-dimethylbenzeneamine", dimethylphenylamine, "aniline, N, N-dimethyl", (dimethylamino)benzene, "dimethyl aniline", DMA



CANADIAN WHMIS SYMBOLS



EMERGENCY OVERVIEW RISK

Causes burns. Risk of serious damage to eyes. Limited evidence of a carcinogenic effect. Toxic by inhalation, in contact with skin and if swallowed. Vapours may cause drowsiness and dizziness. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 40 gram may be fatal or may produce serious damage to the health of the individual.

The substance and/or its metabolites may bind to hemoglobin inhibiting normal uptake of oxygen.

This condition, known as "methemoglobinemia", is a form of oxygen starvation (anoxia).

Central nervous system (CNS) depression may include general discomfort, symptoms of giddiness, headache, dizziness, nausea, anaesthetic effects, slowed reaction time, slurred speech and may progress to unconsciousness.

Serious poisonings may result in respiratory depression and may be fatal.

EYE

The material can produce chemical burns to the eye following direct contact. Vapors or mists may be extremely irritating.

■ If applied to the eyes, this material causes severe eye damage.

SKIN

■ The material can produce chemical burns following direct contactwith the skin.

- Skin contact with the material may produce toxic effects; systemic effectsmay result following absorption.
- The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time.
- Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering.
- Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects.

Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

■ Inhalation of aerosols (mists, fumes), generated by the material during the course of normal handling, may produce toxic effects; these may be fatal.

The material can cause respiratory irritation in some persons.

The body's response to such irritation can cause further lung damage.

■ Inhalation of vapours may cause drowsiness and dizziness.

This may be accompanied by narcosis, reduced alertness, loss of reflexes, lack of coordination and vertigo.

CHRONIC HEALTH EFFECTS

■ There has been concern that this material can cause cancer or mutations, but there is not enough data to make an assessment. Long-term exposure to respiratory irritants may result in disease of the airways involving difficult breathing and related systemic

problems. Limited evidence suggests that repeated or long-term occupational exposure may produce cumulative health effects involving organs or

biochemical systems.

Repeated or prolonged exposure to corrosives may result in the erosion of teeth, inflammatory and ulcerative changes in the mouth and necrosis (rarely) of the jaw. Bronchial irritation, with cough, and frequent attacks of bronchial pneumonia may ensue.

Most arylamines are powerful poisons to the blood-making system. High chronic doses cause congestion of the spleen and tumor formation.

Severe or chronic poisoning may damage the liver, kidney and blood functions.

Haemotological examinations should be performed to ensure that worker exposure is below acceptable levels. (ILO Encyclopaedia, Sax) Effects on the blood (including increased blood methemoglobin levels and decreased hemoglobin concentration) have been reported in exposed workers. Chronic inhalation exposure of rats resulted in effects on the CNS, blood, and liver. Effects on the spleen and blood have been observed in rats and mice chronically exposed via gavage. At higher doses, effects on the liver and kidney were observed. Changes in motor activity, cyanosis, and blanching were reported in rats.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS				
NAME	CAS RN	%		
N,N-dimethylaniline	121-69-7	>98		

Section 4 - FIRST AID MEASURES

SWALLOWED

· IF SWALLOWED, REFER FOR MEDICAL ATTENTION, WHERE POSSIBLE, WITHOUT DELAY. · Where Medical attention is not immediately available or where the patient is more than 15 minutes from a hospital or unless instructed otherwise:

EYE

■ If this product comes in contact with the eyes: · Immediately hold eyelids apart and flush the eye continuously with running water. · Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.

SKIN

■ If skin or hair contact occurs: • Quickly but gently, wipe material off skin with a dry, clean cloth. • Immediately remove all contaminated clothing, including footwear.

INHALED

· If fumes or combustion products are inhaled remove from contaminated area. · Lay patient down. Keep warm and rested.

NOTES TO PHYSICIAN

The material may induce methemoglobinemia following exposure.

Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.

· Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.

For acute or short-term repeated exposures to highly alkaline materials:

· Respiratory stress is uncommon but present occasionally because of soft tissue edema.

· Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.

Section 5 - FIRE FIGHTING MEASURES

Vapor Pressure (mmHg):	0.975 @ 29.5 C
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	0.96
Lower Explosive Limit (%):	1

EXTINGUISHING MEDIA

· Foam.

· Dry chemical powder.

FIRE FIGHTING

· Alert Emergency Responders and tell them location and nature of hazard.

· Wear full body protective clothing with breathing apparatus.

When any large container (including road and rail tankers) is involved in a fire,

consider evacuation by 800 metres in all directions.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

· Combustible.

· Slight fire hazard when exposed to heat or flame.

Combustion products include: carbon dioxide (CO2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material. May emit poisonous fumes.

FIRE INCOMPATIBILITY

Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids, chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses: Safety Glasses. Chemical goggles. Gloves: Respirator: Type AK Filter of sufficient capacity

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

- · Remove all ignition sources.
- · Clean up all spills immediately.

MAJOR SPILLS

· Clear area of personnel and move upwind.

· Alert Emergency Responders and tell them location and nature of hazard.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- \cdot DO NOT allow clothing wet with material to stay in contact with skin.
- · Avoid all personal contact, including inhalation.
- \cdot Wear protective clothing when risk of exposure occurs.

RECOMMENDED STORAGE METHODS

Glass container.

- · Lined metal can, Lined metal pail/drum
- · Plastic pail.
- For low viscosity materials
- \cdot Drums and jerricans must be of the non-removable head type.

· Where a can is to be used as an inner package, the can must have a screwed enclosure.

All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

· Store in original containers.

· Keep containers securely sealed.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
Canada - Alberta Occupational Exposure Limits	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline))	5	25	10	50				
Canada - British Columbia Occupational Exposure Limits	N,N-dimethylaniline (Dimethylaniline)	5		10					Skin
US NIOSH Recommended Exposure Limits (RELs)	N,N-dimethylaniline (N,N-Dimethylaniline)	5	25	10	50				[skin]
US OSHA Permissible Exposure Levels (PELs) - Table Z1	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline))	5	25						
US ACGIH Threshold Limit Values (TLV)	N,N-dimethylaniline (Dimethylaniline)	5		10					TLV Basis: methemoglobinemia. BEI-M
US - Minnesota Permissible Exposure Limits (PELs)	N,N-dimethylaniline (Dimethylaniline (N, N-Dimethylaniline))	5	25	10	50				
US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N-Dimethylaniline))	5	25						

US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N-Dimethylaniline))	5	25	10	50	
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylanaline))	5	25	10	50	
US - California Permissible Exposure Limits for Chemical Contaminants	N,N-dimethylaniline (N,N-Dimethylaniline; dimethylphenylamine)	5	25	10	50	
US - Idaho - Limits for Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline))	5	25			
Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)	N,N-dimethylaniline (N,N-Dimethylaniline)	5	25	10	50	
US - Hawaii Air Contaminant Limits	N,N-dimethylaniline (Dimethylaniline (N-Dimethyl-aniline))	5	25	10	50	
US - Alaska Limits for Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N-Dimethylaniline))	5	25	10	50	
Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline))	5		10		Skin
Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline) - Skin)	5	25	10	50	
US - Washington Permissible exposure limits of air contaminants	N,N-dimethylaniline (Dimethylaniline (N, N-Dimethylaniline))	5		10		
US - Michigan Exposure Limits for Air Contaminants	N,N-dimethylaniline (Dimethylanilline (N,N-Dimethylanilline))	5	25	10	50	

Canada - Prince Edward Island Occupational Exposure Limits	N,N-dimethylaniline (Dimethylaniline)	5		10			TLV Basis: methemoglobinemia. BEI-M
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethylaniline))	5	25				
Canada - Nova Scotia Occupational Exposure Limits	N,N-dimethylaniline (Dimethylaniline)	5		10			TLV Basis: methemoglobinemia. BEI-M
US - Oregon Permissible Exposure Limits (Z-1)	N,N-dimethylaniline (Dimethylaniline (N,N-Dimethy-laniline))	5	25				
Canada - Northwest Territories Occupational Exposure Limits (English)	N,N-dimethylaniline (N,N-Dimethylaniline - Skin)	5	25	10	50		

PERSONAL PROTECTION



RESPIRATOR

•Type AK Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent) EYE

· Safety glasses with side shields.

Chemical goggles.

HANDS/FEET

■ Wear chemical protective gloves, eg. PVC.

Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

· frequency and duration of contact,

· chemical resistance of glove material,

· glove thickness and

· dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).

When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.

 \cdot Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

\cdot Neoprene gloves.

- OTHER
- · Overalls.

· Eyewash unit.

ENGINEERING CONTROLS

Local exhaust ventilation usually required. If risk of overexposure exists, wear an approved respirator.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Liquid. Does not mix with water. Floats on water. Alkaling			
Toxic or noxious vapours/gas.			
State	Liquid	Molecular Weight	121.18
Melting Range (°F)	36	Viscosity	Not Available
Boiling Range (°F)	378- 381	Solubility in water (g/L)	Immiscible
Flash Point (°F)	142	pH (1% solution)	Not applicable.
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	700	Vapor Pressure (mmHg)	0.975 @ 29.5 C
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	0.96
Lower Explosive Limit (%)	1	Relative Vapor Density (air=1)	4.17
Volatile Component (%vol)	Not available.	Evaporation Rate	Not available
Gas group	IIA		
N,N-dimethylaniline			
	log Kow (Prager 199	5):	2.31

APPEARANCE

Yellow-brown, clear, oily liquid with irritating amine odour. May darken on storage. Insoluble in water. Soluble in alcohol, ether, acetone, benzene and chloroform. Alkaline.

log Kow 2.31-2.62 Material

Value

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

· Presence of incompatible materials.

· Product is considered stable.

STORAGE INCOMPATIBILITY

• Many arylamines (aromatic amines such as aniline, N-ethylaniline, o-toluidine, xylidine etc. and their mixtures) are hypergolic (ignite spontaneously) with red fuming nitric acid. When the amines are dissolved in triethylamine, ignition occurs at -60 deg. C. or less.

• Various metal oxides and their salts may promote ignition of amine-red fuming nitric acid systems. Soluble materials such as copper(I) oxide, ammonium metavanadate are effective; insoluble materials such as copper(II) oxide, iron(II) oxide, potassium dichromate are also effective.

· Avoid oxidizing agents, acids, acid chlorides, acid anhydrides.

Avoid strong acids.

· Avoid contact with copper, aluminium and their alloys.

An organic base which reacts violently with strong acids (causing violent splattering), strong oxidisers.

Incompatible with aldehydes, alcohols, acrylates, aldehydes, substituted allyls, alkylene oxides, epichlorohydrin, glycols, halogenated compounds, ketones, organic anhydrides, phenols, cresols, caprolactam solutions, isocyanates, vinyl acetate, .

Contact with benzoyl peroxide, diisopropyl peroxydicarbonate, and other strong oxidisers may cause explosion.

Attacks some plastics, rubber and coatings.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

N,N-dimethylaniline

TOXICITY AND IRRITATION

N,N-DIMETHYLANILINE:

■ unless otherwise specified data extracted from RTECS - Register of Toxic Effects of Chemical Substances.

TOXICITY

IRRITATION

Oral (human) LDLo: 50 mg/kg	Skin (rabbit)10 mg/24h(open)-Mild
Oral (rat) LD50: 1410 mg/kg	Skin (rabbit):500 mg/24h - Mild
Inhalation (rat) LCLo: 250 mg/m³/4h	Eye (rabbit):20 mg/24h - Moderate

Dermal (rabbit) LD50: 1770 mg/kg

■ Asthma-like symptoms may continue for months or even years after exposure to the material ceases. This may be due to a non-allergenic condition known as reactive airways dysfunction syndrome (RADS) which can occur following exposure to high levels of highly irritating compound. Key criteria for the diagnosis of RADS include the absence of preceding respiratory disease, in a non-atopic individual, with abrupt onset of persistent asthma-like symptoms within minutes to hours of a documented exposure to the irritant. A reversible airflow pattern, on spirometry, with the presence of moderate to severe bronchial hyperreactivity on methacholine challenge testing and the lack of minimal lymphocytic inflammation, without eosinophilia, have also been included in the criteria for diagnosis of RADS. RADS (or asthma) following an irritating inhalation is an infrequent disorder with rates related to the concentration of and duration of exposure to the irritating substance. Industrial bronchitis, on the other hand, is a disorder that occurs as result of exposure due to high concentrations of irritating substance (often particulate in nature) and is completely reversible after exposure ceases. The disorder is characterised by dyspnea, cough and mucus production.

The material may produce moderate eye irritation leading to inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.

The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin.

N,N-Dimethylaniline is used as an intermediate in the manufacture of dyes and other substances. Acute (short-term) inhalation exposure to N,N-dimethylaniline has resulted in effects on the central nervous system (CNS) and circulatory system, with headache, cyanosis, and dizziness in humans. Effects on the blood have been reported in exposed workers. Chronic (long-term) inhalation exposure of animals resulted in effects on the CNS, blood, and liver. No information is available on the reproductive, developmental, or carcinogenic effects of N,N-dimethylaniline in humans. In a National Toxicology Program (NTP) study of rats and mice exposed via gavage, increased incidences of tumors of the spleen and forestomach were observed. EPA has not classified N,N-dimethylaniline for potential carcinogenicity

Acute oral exposure resulted in weakness, tremors, tonic and clonic convulsions, and slowing of breathing in guinea pigs. Acute animal tests in rats and rabbits have demonstrated N,N-dimethylaniline to have moderate acute toxicity from oral exposure and high acute toxicity from dermal exposure

CARCINOGEN

N,N-Dimethylaniline	International on Cancer (I Reviewed by Monographs	Agency for Research ARC) - Agents • the IARC	Group	3
Dimethylaniline	US ACGIH T (TLV) - Carci	hreshold Limit Values nogens	Carcinogen Category	A4
N,N-dimethylaniline	US - Rhode Substance L	Island Hazardous ist	IARC	
TWAPPM~	US - Maine (Concern List	Chemicals of High	Carcinogen	A4
SKIN				
N,N-dimethylaniline	US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants - Skin	Skin Designation	x	
N,N-dimethylaniline	US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants - Skin	Skin Designation	x	
N,N-dimethylaniline	US - Washington Permissible exposure limits of air contaminants - Skin	Skin	X	
N,N-dimethylaniline	US ACGIH Threshold Limit Values (TLV) - Skin	Skin Designation	Yes	
N,N-dimethylaniline	US AIHA Workplace Environmental Exposure Levels (WEELs) - Skin	Notes	TLV Basis: methemoglobinen	nia. BEI-M
N,N-dimethylaniline	US NIOSH Recommended Exposure Limits (RELs) - Skin	Skin	Yes	
N,N-dimethylaniline	US - California OEHHA/ARB - Acute Reference Exposure Levels and Target Organs	Skin	x	

	(RELs) - Skin		
N,N-dimethylaniline	US - California OEHHA/ARB - Chronic Reference Exposure Levels and Target Organs (CRELs) - Skin	Skin	x
N,N-dimethylaniline	US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants - Skin	Skin Designation	x
N,N-dimethylaniline	Canada - British Columbia Occupational Exposure Limits - Skin	Notation	Skin
N,N-dimethylaniline	US - Minnesota Permissible Exposure Limits (PELs) - Skin	Skin Designation	x
N,N-dimethylaniline	US - Hawaii Air Contaminant Limits - Skin Designation	Skin Designation	x
N,N-dimethylaniline	US OSHA Permissible Exposure Levels (PELs) - Skin	Skin Designation	x
N,N-dimethylaniline	US - Oregon Permissible Exposure Limits (Z2) - Skin	Skin	X
N,N-dimethylaniline	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	X
N,N-dimethylaniline	US - California Permissible Exposure Limits for Chemical Contaminants - Skin	Skin	S
N,N-dimethylaniline	Canada - Alberta Occupational Exposure Limits - Skin	Substance Interaction	1

Section 12 - ECOLOGICAL INFORMATION

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. This material and its container must be disposed of as hazardous waste. Avoid release to the environment.

Refer to special instructions/ safety data sheets.

Ecotoxicity

Ingredient	Persistence: Water/Soil	Persistence: Air	Bioaccumulation	Mobility
N,N-dimethylaniline	MED	LOW	LOW	HIGH

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.

Puncture containers to prevent re-use and bury at an authorized landfill.

Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.

A Hierarchy of Controls seems to be common - the user should investigate:

- · Reduction
- · Reuse
- · Recycling

· Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.

DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

· Recycle wherever possible or consult manufacturer for recycling options.

· Consult Waste Management Authority for disposal.

Section 14 - TRANSPORTATION INFORMATION



DOT:

Symbols: None Hazard class or Division: 6.1 Identification Numbers: UN2253 PG: II Label Codes: 6.1 Special provisions: IB1, T7, TP2 Packaging: Exceptions: 153 Packaging: Non- bulk: 202 Packaging: Exceptions: 153 Quantity limitations: 5 L Passenger aircraft/rail: Quantity Limitations: Cargo 60 L Vessel stowage: Location: A aircraft only. Vessel stowage: Other: None Hazardous materials descriptions and proper shipping names: N,N-Dimethylaniline Air Transport IATA: UN/ID Number: 2253 Packing Group: II Special provisions: None Cargo Only Packing Instructions: 662 Maximum Qtv/Pack: 60 L Passenger and Cargo Passenger and Cargo Packing Instructions: Y641 Maximum Qty/Pack: 5 L Passenger and Cargo Limited Quantity Passenger and Cargo Limited Quantity Packing Instructions: 654 Maximum Qty/Pack: 1 L Shipping Name: N,N-DIMETHYLANILINE

Maritime Transport IMDG:

IMDG Class: 6.1 IMDG Subrisk: None UN Number: 2253 Packing Group: II EMS Number: F-A,S-A Special provisions: None Limited Quantities: 100 ml Marine Pollutant: Yes Shipping Name: N,N-DIMETHYLANILINE

Section 15 - REGULATORY INFORMATION

N,N-dimethylaniline (CAS: 121-69-7) is found on the following regulatory lists;

"Canada - Alberta Occupational Exposure Limits", "Canada - British Columbia Occupational Exposure Limits", "Canada - Northwest Territories Occupational Exposure Limits (English)","Canada - Nova Scotia Occupational Exposure Limits","Canada - Prince Edward Island Occupational Exposure Limits", "Canada - Prince Edward Island Occupational Exposure Limits - Carcinogens", "Canada - Quebec Permissible Exposure Values for Airborne Contaminants (English)","Canada - Saskatchewan Occupational Health and Safety Regulations - Contamination Limits", "Canada - Yukon Permissible Concentrations for Airborne Contaminant Substances", "Canada Ingredient Disclosure List (SOR/88-64)","Canada Toxicological Index Service - Workplace Hazardous Materials Information System -WHMIS (English)","International Agency for Research on Cancer (IARC) - Agents Reviewed by the IARC Monographs","International Council of Chemical Associations (ICCA) - High Production Volume List", "US - Alaska Limits for Air Contaminants", "US - California Air Toxics ""Hot Spots"" List (Assembly Bill 2588) Substances for which emissions must be quantified", "US - California Occupational Safety and Health Regulations (CAL/OSHA) - Hazardous Substances List", "US - California Permissible Exposure Limits for Chemical Contaminants", "US - California Toxic Air Contaminant List Category V", "US - Connecticut Hazardous Air Pollutants", "US - Hawaii Air Contaminant Limits", "US - Idaho - Limits for Air Contaminants", "US - Massachusetts Oil & Hazardous Material List", "US - Michigan Exposure Limits for Air Contaminants", "US - Minnesota Hazardous Substance List", "US - Minnesota Permissible Exposure Limits (PELs)","US - New Jersey Right to Know Hazardous Substances","US - Oregon Permissible Exposure Limits (Z-1)","US - Pennsylvania -Hazardous Substance List", "US - Rhode Island Hazardous Substance List", "US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Final Rule Limits for Air Contaminants", "US - Vermont Permissible Exposure Limits Table Z-1-A Transitional Limits for Air Contaminants", "US - Washington Permissible exposure limits of air contaminants", "US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants", "US ACGIH Threshold Limit Values (TLV)","US ACGIH Threshold Limit Values (TLV) - Carcinogens","US CAA (Clean Air Act) - HON Rule - Organic HAPs (Hazardous Air Pollutants)","US Clean Air Act - Hazardous Air Pollutants","US Department of Transportation (DOT) List of Hazardous Substances and Reportable Quantities - Hazardous Substances Other Than Radionuclides", "US DOE Temporary Emergency Exposure Limits (TEELs)","US EPA High Production Volume Program Chemical List","US EPA Master Testing List - Index I Chemicals Listed","US

EPCRA Section 313 Chemical List", "US List of Lists - Consolidated List of Chemicals Subject to EPCRA, CERCLA and Section 112(r) of the Clean Air Act", "US NIOSH Recommended Exposure Limits (RELs)", "US OSHA Permissible Exposure Levels (PELs) - Table Z1", "US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory", "US TSCA Section 4 (e) - ITC Priority Testing List", "US TSCA Section 8 (a) - Preliminary Assessment Information Rules (PAIR) - Reporting List", "US TSCA Section 8 (d) - Health and Safety Data Reporting"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

Cumulative effects may result following exposure*.

* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references. A list of reference resources used to assist the committee may be found at: www.chemwatch.net/references.

■ The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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Issue Date: May-13-2008 Print Date:Aug-5-2011