MSDS – MATERIAL SAFETY DATA SHEET

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DIETHYLAMINE

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1. Product Identification

Synonyms: Ethanamine, N-ethyl-; diethylamine 98%; DEN
CAS No.: 109-89-7
Molecular Weight: 73.14
Chemical Formula: (C2H5)2NH

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2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Diethylamine	109-89-7	100%	Yes

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3. Hazards Identification

Emergency Overview

DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CORROSIVE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES BURNS TO ANY AREA OF CONTACT. AFFECTS THE CARDIOVASCULAR SYSTEM.

SAFETY DATA Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Life)
Flammability Rating: 3 - Severe (Flammable)
Reactivity Rating: 1 - Slight
Contact Rating: 4 - Extreme (Corrosive)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER
Storage Color Code: Red (Flammable)

Potential Health Effects

Inhalation:
Corrosive. Vapors irritate the respiratory tract causing coughing, chest pain, or immediate or delayed breathing difficulties. Exposure to moderately high concentrations of the vapor may cause severe pulmonary edema. Experimental animals exposed to 100ppm showed severe heart tissue degeneration.
Ingestion:
Corrosive. Harmful if swallowed. May cause burns of the mouth, throat and stomach with severe abdominal pain and collapse. Ingestion may cause death if not treated promptly. Ingestion has been linked to cardiovascular effects in laboratory animals.
Skin Contact:
Corrosive. Contact can cause irritation with redness, pain, and possible skin burns. Covered contact with wet clothing can cause severe skin burns. May be absorbed through the skin.
Eye Contact:
Corrosive. Vapors irritate the eyes, causing tears, redness, pain, blurred vision. Corneal edema may occur with symptoms of "blue haze" or fogginess around lights. Liquid contact is an emergency and will produce serious eye injury, possibly blindness.
Chronic Exposure:
Repeated contact of eyes with vapors may result in swelling of the eyes and foggy vision. Chronic exposure may affect kidney and liver. Animal studies have shown target organ effects on the heart.
Aggravation of Pre-existing Conditions:
Persons with pre-existing skin disorders, eye problems, asthma, liver or kidney disorders, or impaired respiratory function may be more susceptible to the effects of the substance.

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4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician immediately.

Ingestion:
DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Call a physician immediately. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician, immediately. Wash clothing before reuse.
Eye Contact:
Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Call a physician immediately.

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5. Fire Fighting Measures

Fire:
Flash point: -28C (-18F) CC
Autoignition temperature: 312C (594F)
Flammable limits in air % by volume:
lel: 1.8; uel: 10.1
Extremely Flammable. Contact with strong oxidizers may cause fire and explosions.
Explosion:
Above flash point, vapor-air mixtures are explosive within flammable limits noted above. Vapors can flow along surfaces to distant ignition source and flash back. Sensitive to static discharge.
Fire Extinguishing Media:
Dry chemical, alcohol foam or carbon dioxide. Water may be ineffective. Use water to cool fire-exposed containers, to dilute spills, to flush spills, and to disperse vapors.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. This highly flammable liquid must be kept from sparks, open flame, hot surfaces, and all sources of heat and ignition. Fight fire from protected location

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6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! Use water spray to keep vapor concentrations below explosive limits. US Regulations

(CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

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7. Handling and Storage

Protect against physical damage. Store in a cool, dry well-ventilated location, away from any area where the fire hazard may be acute. Outside or detached storage is preferred. Separate from incompatibles. Containers should be bonded and grounded for transfers to avoid static sparks. Storage and use areas should be No Smoking areas. Use non-sparking type tools and equipment, including explosion proof ventilation. Do not add nitrites or other nitrosating agents; a nitrosamine, which may cause cancer, may be formed. Empty containers may contain explosive vapors. Flush empty containers with water to remove residual flammable liquid and vapors. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product.

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8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
25 ppm (TWA)

-ACGIH Threshold Limit Value (TLV):
5 ppm (TWA), 15 ppm (STEL), skin,
A4-not classifiable as a human carcinogen.
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, a full facepiece respirator with an ammonia/methylamine cartridge may be worn up to 50 times the exposure limit or the maximum use concentration specified by the appropriate regulatory agency or respirator supplier, whichever is lowest. For emergencies or instances where the exposure levels are not known, use a full-facepiece positive-pressure, air-supplied respirator. WARNING: Air purifying respirators do not protect workers in oxygen-deficient atmospheres. The recommended cartridge is not specifically approved for this substance. Organic vapor cartridges are also approved for this material, but they have a short service life (i.e., less than 30 minutes at concentrations ten times the

exposure limits).
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

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9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Ammonia odor.
Solubility:
Completely soluble in water.
Specific Gravity:
0.707 @ 20C/4C
pH:
Strongly alkaline.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
55C (131F)
Melting Point:
-50C (-58F)
Vapor Density (Air=1):
2.53
Vapor Pressure (mm Hg):
400 @ 38C (100F)
Evaporation Rate (BuAc=1):
16.9

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10. Stability and Reactivity

Stability:
Stable under ordinary conditions of use and storage.
Hazardous Decomposition Products:
Burning may produce ammonia, carbon monoxide, carbon dioxide, nitrogen oxides.
Hazardous Polymerization:
Will not occur.

Incompatibilities:
Strong oxidizers, acids, cellulose nitrate, some metals and dicyanofuroxan. N-nitrosamines, many of which are known to be potent carcinogens, may be formed when this product comes in contact with nitrous acid, nitrates, or atmospheres with high nitrous oxide concentrations.
Conditions to Avoid:
Heat, flames, ignition sources and incompatibles.

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11. Toxicological Information

Oral rat LD50: 540 mg/kg; inhalation rat LC50: 4000 ppm/4H; skin rabbit LD50: 820 mg/kg; investigated as a mutagen.

--------\Cancer Lists\----------

	---NTP Carcinogen---		
Ingredient	Known	Anticipated	IARC Category
Diethylamine (109-89-7)	No	No	None

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12. Ecological Information

Environmental Fate:
When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition. When released into the air, this material is expected to be readily degraded by reaction with photochemically produced hydroxyl radicals. This material is not expected to significantly bioaccumulate. This material has an estimated bioconcentration factor (BCF) of less than 100. When released into the water, this material is expected to have a half-life between 1 and 10 days. When released into water, this material is expected to readily biodegrade. When released into the soil, this material may biodegrade to a moderate extent. When released into the soil, this material may leach into groundwater. When released into the soil, this material is expected to quickly evaporate.
Environmental Toxicity:
This material is not expected to be toxic to aquatic life. The LC50/96-hour values for fish are over 100 mg/l.

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13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

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14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: DIETHYLAMINE
Hazard Class: 3, 8
UN/NA: UN1154
Packing Group: II
Information reported for product/size: 2.5L

International (Water, I.M.O.)

Proper Shipping Name: DIETHYLAMINE
Hazard Class: 3, 8
UN/NA: UN1154
Packing Group: II
Information reported for product/size: 2.5L

International (Air, I.C.A.O.)

Proper Shipping Name: DIETHYLAMINE
Hazard Class: 3, 8
UN/NA: UN1154
Packing Group: II
Information reported for product/size: 2.5L

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15. Regulatory Information

--------\Chemical Inventory Status - Part 1\----------

Ingredient	TSCA	EC	Japan	Australia
Diethylamine (109-89-7)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\----------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Diethylamine (109-89-7)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\----------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Diethylamine (109-89-7)	No	No	No	No

--------\Federal, State & International Regulations - Part 2\----------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Diethylamine (109-89-7)	100	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: Yes Pressure: No
Reactivity: No (Pure / Liquid)

Australian Hazchem Code: 2WE
Poison Schedule: None allocated.
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

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16. Other Information

NFPA Ratings: Health: **3** Flammability: **3** Reactivity: **0**
Label Hazard Warning:
DANGER! EXTREMELY FLAMMABLE LIQUID AND VAPOR. VAPOR MAY CAUSE FLASH FIRE. CORROSIVE. HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. CAUSES BURNS TO ANY AREA OF CONTACT. AFFECTS THE CARDIOVASCULAR SYSTEM.
Label Precautions:
Keep away from heat, sparks and flame.
Do not get in eyes, on skin, or on clothing.
Do not breathe vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Label First Aid:
In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In all cases call a physician immediately.
Product Use:
Laboratory Reagent.

Revision Information: No Changes.
Disclaimer:
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