Safety Data Sheet
The Dow Chemical Company

Product Name: N-Methyldiethanolamine (MDEA)

Revision Date: 2009/07/21
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The Dow Chemical Company encourages and expects you to read and understand the entire (M)SDS, as there is important information throughout the document. We expect you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

1. Identification of the substance/preparation and of the company/undertaking

Product Name
N-Methyldiethanolamine (MDEA)

Use of the substance/preparation
Chemical intermediate. We recommend that you use this product in a manner consistent with the listed use. If your intended use is not consistent with the stated use, please contact your sales or technical service representative.

COMPANY IDENTIFICATION
The Dow Chemical Company
2030 Willard H. Dow Center
48674 Midland, MI
USA

Customer Information Number: 800-258-2436
For questions about this SDS, contact: SDSQuestion@dow.com

EMERGENCY TELEPHONE NUMBER
24-Hour Emergency Contact: 989-636-4400
Local Emergency Contact: 00 44 155 37 61 251

2. Hazards Identification

Irritating to eyes.

3. Composition/information on ingredients

Component	Amount	Classification:	CAS #	EC #
2,2'-(Methylimino) diethanol; N-methyldiethanolamine	> 99.0 %	Xi: R36	105-59-9	203-312-7

2-Methylaminoethanol; N-methyl-2-ethanolamine	< 0.5 %	Xn: R21/22; C: R34	109-83-1	203-710-0

See Section 16 for full text of R-phrases.

4. First-aid measures

Eye Contact: Wash immediately and continuously with flowing water for at least 30 minutes. Remove contact lenses after the first 5 minutes and continue washing. Obtain prompt medical consultation, preferably from an ophthalmologist. Eye wash fountain should be located in immediate work area.
Skin Contact: Wash skin with plenty of water.
Inhalation: Move person to fresh air; if effects occur, consult a physician.
Ingestion: Do not induce vomiting. Give one cup (8 ounces or 240 ml) of water or milk if available and transport to a medical facility. Do not give anything by mouth unless the person is fully conscious.
Notes to Physician: Chemical eye burns may require extended irrigation. Obtain prompt consultation, preferably from an ophthalmologist. If burn is present, treat as any thermal burn, after decontamination. Due to irritant properties, swallowing may result in burns/ulceration of mouth, stomach and lower gastrointestinal tract with subsequent stricture. Aspiration of vomitus may cause lung injury. Suggest endotracheal/esophageal control if lavage is done. No specific antidote. Treatment of exposure should be directed at the control of symptoms and the clinical condition of the patient.
Emergency Personnel Protection: First Aid responders should pay attention to self-protection and use the recommended protective clothing (chemical resistant gloves, splash protection). If potential for exposure exists refer to Section 8 for specific personal protective equipment.

5. Fire Fighting Measures

Extinguishing Media: Water fog or fine spray. Dry chemical fire extinguishers. Carbon dioxide fire extinguishers. Foam. Do not use direct water stream. May spread fire. Alcohol resistant foams (ATC type) are preferred. General purpose synthetic foams (including AFFF) or protein foams may function, but will be less effective.
Fire Fighting Procedures: Keep people away. Isolate fire and deny unnecessary entry. Burning liquids may be extinguished by dilution with water. Do not use direct water stream. May spread fire. Burning liquids may be moved by flushing with water to protect personnel and minimize property damage.
Special Protective Equipment for Firefighters: Wear positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, trousers, boots, and gloves). Avoid contact with this material during fire fighting operations. If contact is likely, change to full chemical resistant fire fighting clothing with self-contained breathing apparatus. If this is not available, wear full chemical resistant clothing with self-contained breathing apparatus and fight fire from a remote location. For protective equipment in post-fire or non-fire clean-up situations, refer to the relevant sections.
Unusual Fire and Explosion Hazards: Violent steam generation or eruption may occur upon application of direct water stream to hot liquids.
Hazardous Combustion Products: During a fire, smoke may contain the original material in addition to combustion products of varying composition which may be toxic and/or irritating. Combustion products may include and are not limited to: Nitrogen oxides. Carbon monoxide. Carbon dioxide.

6. Accidental Release Measures

Steps to be Taken if Material is Released or Spilled: Small spills: Absorb with materials such as: Non-combustible material. Clay. Vermiculite. Zorb-all®. Do NOT use absorbent materials such as: Ground corn cobs. Moist organic absorbents. Peat moss. Sawdust. Collect in suitable and properly labeled containers. Large spills: Contain spilled material if possible. Pump into suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

Personal Precautions: Evacuate area. Refer to Section 7, Handling, for additional precautionary measures. Only trained and properly protected personnel must be involved in clean-up operations. Keep upwind of spill. Ventilate area of leak or spill. Use appropriate safety equipment. For additional information, refer to Section 8, Exposure Controls and Personal Protection.
Environmental Precautions: Prevent from entering into soil, ditches, sewers, waterways and/or groundwater. See Section 12, Ecological Information.

7. Handling and Storage

Handling
General Handling: Do not get in eyes. Do not swallow. Avoid contact with skin and clothing. Avoid breathing vapor. Wash thoroughly after handling. Keep container closed. Use with adequate ventilation. Do not use sodium nitrite or other nitrosating agents in formulations containing this product. Suspected cancer-causing nitrosamines could be formed. See Section 8, EXPOSURE CONTROLS AND PERSONAL PROTECTION.
Other Precautions: Spills of these organic materials on hot fibrous insulations may lead to lowering of the autoignition temperatures possibly resulting in spontaneous combustion.

Storage
Store in a dry place. Avoid moisture. Do not store in: Copper. Copper alloys. Galvanized containers.

8. Exposure Controls / Personal Protection

Exposure Limits

None established

Personal Protection
Eye/Face Protection: Use chemical goggles. Chemical goggles should be consistent with EN 166 or equivalent. Eye wash fountain should be located in immediate work area.
Skin Protection: Use protective clothing chemically resistant to this material. Selection of specific items such as face shield, boots, apron, or full body suit will depend on the task. Remove contaminated clothing immediately, wash skin area with soap and water, and launder clothing before reuse or dispose of properly.

Hand protection: Use chemical resistant gloves classified under Standard EN374: Protective gloves against chemicals and micro-organisms. Examples of preferred glove barrier materials include: Chlorinated polyethylene. Polyethylene. Ethyl vinyl alcohol laminate ("EVAL"). Examples of acceptable glove barrier materials include: Butyl rubber. Natural rubber ("latex"). Neoprene. Nitrile/butadiene rubber ("nitrile" or "NBR"). Polyvinyl alcohol ("PVA"). Polyvinyl chloride ("PVC" or "vinyl"). Viton. 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) 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) is recommended. NOTICE: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all relevant workplace factors such as, but not limited to: Other chemicals which may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), potential body reactions to glove materials, as well as the instructions/specifications provided by the glove supplier.

Respiratory Protection: Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. For most conditions, no respiratory protection should be needed; however, if material is heated or sprayed, use an approved air-purifying respirator. Use the following CE approved air-purifying respirator: Organic vapor cartridge with a particulate pre-filter, type AP2.

Ingestion: Avoid ingestion of even very small amounts; do not consume or store food or tobacco in the work area; wash hands and face before smoking or eating.

Engineering Controls

Ventilation: Use local exhaust ventilation, or other engineering controls to maintain airborne levels below exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, general ventilation should be sufficient for most operations. Local exhaust ventilation may be necessary for some operations.

9. Physical and Chemical Properties

Physical State	Liquid.
Color	Colorless
Odor	Ammoniacal
Odor Threshold	No test data available
Flash Point - Closed Cup	138 °C *Pensky-Martens Closed Cup ASTM D 93*
Flammability (solid, gas)	No
Flammable Limits In Air	**Lower**: 1.4 %(V) *Literature* **Upper**: 10 %(V) *Literature*
Autoignition Temperature	No test data available
Vapor Pressure	< 0.01 kPa @ 20 °C *Literature*
Boiling Point (760 mmHg)	247.3 °C *Literature* .
Vapor Density (air = 1)	4.1 *Literature*
Specific Gravity (H2O = 1)	1.041 20 °C/20 °C *Literature*
Freezing Point	-21 °C *Literature*
Melting Point	No test data available
Solubility in water (by weight)	100 % @ 20 °C *Literature*
pH	10.4 *Literature* 1% aqueous solution.
Molecular Weight	No test data available
Decomposition Temperature	No test data available
Partition coefficient, n-octanol/water (log Pow)	No test data available
Evaporation Rate (Butyl Acetate = 1)	No test data available
Dynamic Viscosity	101 mPa.s @ 20 °C *Literature*

10. Stability and Reactivity

Stability/Instability

Stable under recommended storage conditions. See Storage, Section 7. Hygroscopic.
Conditions to Avoid: Exposure to elevated temperatures can cause product to decompose. Avoid moisture.

Incompatible Materials: Avoid contact with: Nitrites. Strong acids. Strong oxidizers. Product may potentially react with various halogenated organic solvents, resulting in temperature and/or pressure increases Corrosive when wet. Heating above 60°C in the presence of aluminum can result in corrosion and generation of flammable hydrogen gas. Avoid unintended contact with: Halogenated hydrocarbons.

Hazardous Polymerization

Will not occur.

Thermal Decomposition

Decomposition products depend upon temperature, air supply and the presence of other materials.

11. Toxicological Information

Acute Toxicity

Ingestion

Low toxicity if swallowed. Swallowing may result in burns of the mouth and throat. Swallowing may result in gastrointestinal irritation or ulceration. May cause nausea and vomiting. May cause abdominal discomfort or diarrhea.
As product. Single dose oral LD50 has not been determined.
For the major component(s): LD50, Rat 1,945 - 4,780 mg/kg

Aspiration hazard

Aspiration into the lungs may occur during ingestion or vomiting, causing tissue damage or lung injury.

Eye Contact

May cause severe irritation with corneal injury which may result in permanent impairment of vision, even blindness. Chemical burns may occur.

Skin Contact

Brief contact may cause slight skin irritation with local redness. Prolonged contact may cause moderate skin irritation with local redness. Repeated contact may cause skin burns. Symptoms may include pain, severe local redness, swelling, and tissue damage. May cause more severe response if skin is abraded (scratched or cut). May cause more severe response on covered skin (under clothing, gloves).

Skin Absorption

Prolonged skin contact is unlikely to result in absorption of harmful amounts.
As product.
For the major component(s): LD50, Rabbit 6,240 mg/kg

Inhalation

At room temperature, exposure to vapor is minimal due to low volatility. If material is heated or aerosol/mist is produced, concentrations may be attained that are sufficient to cause respiratory irritation and other effects.

Repeated Dose Toxicity

Based on available data, repeated exposures are not anticipated to cause additional significant adverse effects.

Chronic Toxicity and Carcinogenicity

No relevant information found.

Developmental Toxicity

Contains component(s) which did not cause birth defects in laboratory animals.

Reproductive Toxicity

For the minor component(s): In animal studies, has been shown to interfere with reproduction.

Genetic Toxicology

For the major component(s): In vitro genetic toxicity studies were negative. Animal genetic toxicity studies were negative.

12. Ecological Information

ENVIRONMENTAL FATE

Data for Component: **2,2'-(Methylimino) diethanol; N-methyldiethanolamine**

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).
Henry's Law Constant (H): 1.07E-06 atm*m3/mole; 25 °C Estimated.
Partition coefficient, n-octanol/water (log Pow): < 0.2 Measured
Partition coefficient, soil organic carbon/water (Koc): 1 Estimated.

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability. Material is ultimately biodegradable (reaches > 70% mineralization in OECD test(s) for inherent biodegradability).

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
96 %	18 d	OECD 301A Test
94 %	7 d	OECD 302B Test

Data for Component: **2-Methylaminoethanol; N-methyl-2-ethanolamine**

Movement & Partitioning

Bioconcentration potential is low (BCF less than 100 or log Pow less than 3). Potential for mobility in soil is very high (Koc between 0 and 50).
Henry's Law Constant (H): 8.6E-08 atm*m3/mole; 25 °C Estimated.
Partition coefficient, n-octanol/water (log Pow): -0.94 Measured
Partition coefficient, soil organic carbon/water (Koc): 1.38 Estimated.

Persistence and Degradability

Material is readily biodegradable. Passes OECD test(s) for ready biodegradability.

OECD Biodegradation Tests:

Biodegradation	Exposure Time	Method
93 %	21 d	OECD 301A Test
81.7 %	28 d	OECD 301F Test

ECOTOXICITY

Data for Component: **2,2'-(Methylimino) diethanol; N-methyldiethanolamine**

Material is not classified as dangerous to aquatic organisms (LC50/EC50/IC50/LL50/EL50 greater than 100 mg/L in most sensitive species).

Fish Acute & Prolonged Toxicity
LC50, fathead minnow (Pimephales promelas), static, 96 h: 1,200 mg/l
Aquatic Invertebrate Acute Toxicity
LC50, water flea Daphnia magna, static, 48 h, immobilization: 250 mg/l

Data for Component: **2-Methylaminoethanol; N-methyl-2-ethanolamine**

Material is harmful to aquatic organisms (LC50/EC50/IC50 between 10 and 100 mg/L in the most sensitive species).

Fish Acute & Prolonged Toxicity
LC50, zebra fish (Brachydanio rerio): > 100 mg/l
Aquatic Invertebrate Acute Toxicity
EC50, water flea Daphnia magna, immobilization: 33 mg/l
Aquatic Plant Toxicity
EC50, alga Scenedesmus sp., biomass growth inhibition: 18.4 mg/l
Toxicity to Micro-organisms
IC50; activated sludge, respiration inhibition: > 1,000 mg/l

13. Disposal Considerations

This product, when being disposed of in its unused and uncontaminated state should be treated as a hazardous waste according to EC Directive 91/689/EEC. Any disposal practices must be in compliance with all national and provincial laws and any municipal or local by-laws governing hazardous waste. For used, contaminated and residual materials additional evaluations may be required. Do not dump into any sewers, on the ground, or into any body of water.

14. Transport Information

ROAD & RAIL
NOT REGULATED

OCEAN
NOT REGULATED

AIR
NOT REGULATED

INLAND WATERWAYS
NOT REGULATED

15. Regulatory Information

European Inventory of Existing Commercial Chemical Substances (EINECS)
This product is on the EINECS inventory.

EC Classification and User Label Information

Hazard Symbol:
Xi - Irritant.
Risk Phrases :
R36 - Irritating to eyes.

Safety Phrases :
S24 - Avoid contact with skin.
Chemical Name 2,2'-(Methylimino) diethanol; N-methyldiethanolamine (EC Label) (EC # 203-312-7)

16. Other Information

Risk-phrases in the Composition section

R21/22	Harmful in contact with skin and if swallowed.
R34	Causes burns.
R36	Irritating to eyes.

Product Literature

Additional information on this product may be obtained by calling your sales or customer service contact. Ask for a product brochure. Additional information on this and other Dow products may be obtained by visiting our web page at www.dow.com.

Revision

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Most recent revision(s) are noted by the bold, double bars in left-hand margin throughout this document.

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