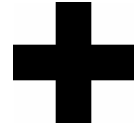




# THE DOW CHEMICAL COMPANY MATERIAL SAFETY DATA SHEET



**Product Name:** DIETHANOLAMINE 85% GT GRADE  
**MSDS#:** 849

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Dow (hereinafter, and for purposes of this MSDS only, refers to The Dow Chemical Company and to Dow Chemical Canada Inc.) encourages and expects you to read and understand the entire MSDS, as there is important information throughout the document. Dow expects you to follow the precautions identified in this document unless your use conditions would necessitate other appropriate methods or actions.

## 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

### 1.1 IDENTIFICATION

**Product Name** DIETHANOLAMINE 85% GT GRADE

### 1.2 COMPANY IDENTIFICATION

The Dow Chemical Company  
Midland, MI 48674

### 1.3 EMERGENCY TELEPHONE NUMBER

**24-HOUR EMERGENCY TELEPHONE NUMBER: (989)636-4400.**  
Customer Information Number: 1-800-258-2436.

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## 2. COMPOSITION INFORMATION

<u>Component</u>	<u>CAS #</u>	<u>Amount (%W/W )</u>
N,N-Diethanolamine	111-42-2	85 %
Water	7732-18-5	15 %

## 3. HAZARDS IDENTIFICATION

### 3.1 EMERGENCY OVERVIEW

**Appearance** Colorless to Yellow

**Physical State** Liquid

**Odor** Ammoniacal

**Hazards of product** CAUSES EYE AND SKIN IRRITATION.  
HARMFUL IF INHALED OR ABSORBED THROUGH SKIN.  
HARMFUL IF SWALLOWED.  
ISOLATE AREA.  
KEEP UPWIND OF SPILL.  
STAY OUT OF LOW AREAS.  
  
REPEATED EXPOSURE MAY CAUSE LIVER AND KIDNEY DAMAGE.

### 3.2 POTENTIAL HEALTH EFFECTS

#### Effects of Single Acute Overexposure

**Inhalation** Vapor or mist from heated material may cause irritation of the respiratory tract, experienced as nasal discomfort and discharge, with chest pain and coughing.

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**Eye Contact** Causes moderate to severe irritation, experienced as discomfort or pain, excess blinking and tear production, with marked excess redness and swelling of the conjunctiva. Causes corneal injury.

**Skin Contact** Brief contact may cause slight irritation with itching and local redness. Prolonged contact may cause more severe irritation, with discomfort or pain, local redness and swelling, and possible tissue destruction.

**Skin Absorption** Prolonged or widespread contact may result in the absorption of potentially harmful amounts of material.

**Swallowing** Moderately toxic. May cause irritation of the mouth and throat, abdominal discomfort, nausea, vomiting, and diarrhea. May cause dizziness, drowsiness, faintness, weakness, collapse, and coma.

## Chronic, Prolonged or Repeated Overexposure

**Effects of Repeated Overexposure** Repeated overexposure may cause damage to kidneys and liver.

**Other Effects of Overexposure** None currently known.

## Medical Conditions Aggravated by Exposure

Skin contact may aggravate an existing dermatitis. Inhalation of material may aggravate asthma and inflammatory or fibrotic pulmonary disease.

See Section 11 for toxicological information and additional information about potential health effects.

## **3.3 POTENTIAL ENVIRONMENTAL EFFECTS**

See Section 12 for Ecological Information.

## **4. FIRST AID PROCEDURES**

### **4.1 INHALATION**

Remove to fresh air.

### **4.2 EYE CONTACT**

Immediately flush eyes with water and continue washing for at least 15 minutes. DO NOT remove contact lenses, if worn. Obtain medical attention without delay, preferably from an ophthalmologist.

### **4.3 SKIN CONTACT**

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Remove contaminated clothing. Wash skin with soap and water. Obtain medical attention if contact has been widespread and prolonged, or if irritation persists. Wash clothing before reuse.

## **4.4 SWALLOWING**

If patient is fully conscious, give two glasses of water. Induce vomiting. This should be done only by medical or experienced first-aid personnel. Obtain medical attention.

## **4.5 NOTES TO PHYSICIAN**

There is no specific antidote. Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.

The hazards of this material are due mainly to its severely irritant properties on skin and mucosal surfaces.

## **5. FIRE FIGHTING MEASURES**

### **5.1 FLAMMABLE PROPERTIES - REFER TO SECTION 9, PHYSICAL AND CHEMICAL PROPERTIES**

### **5.2 EXTINGUISHING MEDIA**

Extinguish fires with water spray or apply alcohol-type or all-purpose-type foam by manufacturer's recommended techniques for large fires. Use carbon dioxide or dry chemical media for small fires.

### **5.3 FIRE FIGHTING PROCEDURES**

Do not direct a solid stream of water or foam into burning molten material; this may cause spattering and spread the fire.

### **5.4 SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS**

Use self-contained breathing apparatus, eye protection, and protective clothing.

### **5.5 UNUSUAL FIRE AND EXPLOSION HAZARDS**

During fire, oxides of nitrogen may be evolved.  
See Section 8.3 - Engineering Controls

### **5.6 HAZARDOUS COMBUSTION PRODUCTS**

Burning can produce the following products: Oxides of carbon and nitrogen. Carbon monoxide is highly toxic if inhaled; carbon dioxide in sufficient concentrations can act as an asphyxiant. Acute overexposure to the products of combustion may result in irritation of the respiratory tract.

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## **6. ACCIDENTAL RELEASE MEASURES**

### **Steps to be Taken if Material is Released or Spilled:**

Contain spilled material if possible. Collect in suitable and properly labeled containers. See Section 13, Disposal Considerations, for additional information.

**Personal Precautions:** Isolate area. Refer to Section 7, Handling for additional precautionary measures. Keep unnecessary and unprotected personnel from entering the area. Keep personnel out of low areas. 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**

### **7.1 HANDLING**

#### **General Handling**

Do not get in eyes, on skin, on clothing.

Avoid breathing vapor.

Do not swallow.

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.

#### **Ventilation**

General (mechanical) room ventilation is expected to be satisfactory where this product is stored and handled in closed equipment. Special local ventilation is needed at points where vapors can be expected to escape to the workplace air.

### **7.2 STORAGE**

Additional storage and handling information on this product may be obtained by calling your Dow sales or customer service contact.

## **8. EXPOSURE CONTROLS AND PERSONAL PROTECTION**

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## 8.1 EXPOSURE LIMITS

<b>Component</b>	<b>Exposure Limits</b>	<b>Skin. Form</b>
N,N-Diethanolamine	2 mg/m <sup>3</sup> TWA8 ACGIH	Yes

*In the Exposure Limits Chart above, if there is no specific qualifier (i.e., Aerosol) listed in the Form Column for a particular limit, the listed limit includes all airborne forms of the substance that can be inhaled.*

*A "Yes" in the Skin Column indicates a potential significant contribution to overall exposure by the cutaneous (skin) route, including mucous membranes and the eyes, either by contact with vapors or by direct skin contact with the substance. A "Blank" in the Skin Column indicates that exposure by the cutaneous (skin) route is not a potential significant contributor to overall exposure.*

## 8.2 PERSONAL PROTECTION

**Respiratory Protection:** Use self-contained breathing apparatus in high vapor concentrations.

**Ventilation:** General (mechanical) room ventilation is expected to be satisfactory where this product is stored and handled in closed equipment. Special local ventilation is needed at points where vapors can be expected to escape to the workplace air.

**Eye Protection:** Monogoggles

**Protective Gloves:** Polyvinyl chloride coated

**Other Protective Equipment:** Eye bath, safety shower, and chemical apron.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical State:** Liquid

**Appearance:** Colorless to Yellow

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**Odor:** Ammoniacal

**Flash Point - Closed Cup:** 168 °C 335 °F *Pensky-Martens Closed Cup ASTM D 93*

**Flammable Limits In Air:**

Lower *No test data available.*  
Upper *No test data available.*

**Autoignition Temperature:** *No test data available.*

**Vapor Pressure:** 3.5 mmHg 20 °C

**Boiling Point (760 mmHg):** 127 °C 260 °F

**Vapor Density (air = 1):** 2.1

**Specific Gravity (H<sub>2</sub>O = 1):** 1.094 20 °C / 20 °C

**Freezing Point:** ~ -6 °C ~ 21 °F

**Melting Point:** *Not applicable.*

**Solubility in Water (by weight):** 100 % 20 °C

**pH:** *No test data available.*

**Octanol/Water Partition Coefficient - Measured:** -1.43

**Evaporation Rate (Butyl Acetate = 1):** 0.33

**Percent Volatiles:** 15 Wt%

## 10. STABILITY AND REACTIVITY

**10.1 STABILITY/INSTABILITY** Stable.

**Conditions to Avoid:** Temperatures above 250 degrees C. May undergo self-sustaining thermal decomposition.

**Incompatible Materials:** Strong oxidizing agents. Strong bases. Strong acids. Aldehydes. Ketones. Acrylates. Organic anhydrides. Organic halides. Formates. Oxalates.

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**10.2 HAZARDOUS POLYMERIZATION** Will not occur.

## 11. TOXICOLOGICAL INFORMATION

The following information is applicable to diethanolamine.

### ACUTE TOXICITY

#### Peroral

Rat; males; LD50 = 1.58 (1.34 - 1.85) ml/kg; slope not available

**Time to Death:** 3.5 hr to 6 days.

#### Peroral

Rat; females; LD50 = 0.62 (0.45 - 0.85) ml/kg; slope not available

**Time to Death:** 3.5 hr to 6 days.

#### Peroral

Combined effects for males and females:

**Major Signs:** sluggishness, lacrimation, piloerection, tremors, prostration, red discharge on fur, depressed body temperature.

**Gross Pathology:** lungs, kidneys, stomachs, and intestines discolored, stomachs gas or liquid-filled.

#### Percutaneous

Rabbit; males; LD50 = 7.46 (5.05 - 11.0) ml/kg; slope not available; 24 h occluded.

**Time to Death:** 2 to 10 days.

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## **Percutaneous**

Rabbit; females; LD50 = 9.85 (7.15 - 13.6) ml/kg; slope not available; 24 h occluded.

**Time to Death:** 2 to 10 days.

## **Percutaneous**

Combined effects for males and females:

**Major Signs:** sluggishness, unsteady gait (in one), prostration (in one), emaciation, red discharge on perioral or perinasal fur

**Irritation:** erythema, edema, ecchymosis, necrosis, ulceration, desquamation, alopecia, scabs and fissuring (on one)

**Gross Pathology:** kidneys, thymus, lungs and trachea discolored, bladder filled with blood, hemorrhaged and/or liquid-filled intestines, liquid-filled abdominal cavity.

## **Inhalation**

Substantially saturated vapor studies, 6 hour exposure static generation method Rat

**Mortality:** 0/5

**Gross Pathology:** Nothing remarkable.

## **Inhalation**

Mist/vapor study, at 170°C, 8 hour Rat; males and females

**Mortality:** 0/6

## **IRRITATION**

**Skin.:** Rabbit; 4-hour occluded contact; 0.5 ml

**Results:** minor transient erythema in one; healed by one day.

**Eye:** Rabbit; 0.005 ml

**Results:** iritis, minor to moderate conjunctival irritation with significant discharge, minor corneal injury, by 72 hours, all eyes were healed except for minor conjunctival redness in one. All eyes were healed by 7 days.

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## **REPEATED EXPOSURE**

In a 90-day dietary study with rats, the rats that received 4.0, 2.0, 1.0, and 0.5% of diethanolamine died within 4 to 30 days. The major signs were cloudy swelling and degeneration of the kidney tubules and early fatty degeneration of the liver. A second study was conducted with doses of 0.5, 0.125, 0.03, and 0.0075% diethanolamine. The NOEL was between 0.03% (0.02 gm/kg/day) and 0.125% (0.09 gm/kg/day) with 0.5 and 0.125% producing slight increases in liver and kidney weights.

## **SENSITIZATION (ANIMAL AND HUMAN STUDIES)**

Human; Repeated-insult skin patch testing has produced negative results. There have been no animal studies assessing the skin sensitization potential of diethanolamine; however, numerous studies with the guinea pig with triethanolamine failed to induce sensitization.

## **DEVELOPMENTAL TOXICITY**

In a developmental study with rats presented in literature, doses of up to 1200 mg/kg were administered by gavage. All animals at 500 mg/kg or higher died or were moribund. The NOEL was 50 mg/kg/day for maternal toxicity and greater than 200 mg/kg/day for embryofetal toxicity and teratogenicity. In a cutaneous study with rats, doses of up to 1500 mg/kg were administered. Doses of 500 and 1500 mg/kg produced moderate and severe skin irritation, respectively. The NOEL was less than 150 mg/kg/day for maternal toxicity, 500 mg/kg/day for embryofetal toxicity, and greater than 1500 mg/kg/day for teratogenicity. In the fetuses, increased incidences of six skeletal variations involving the axial skeleton and distal appendages were observed in the 1500 mg/kg group. In a cutaneous study with rabbits, doses of up to 350 mg/kg were administered. 350 mg/kg produced marked skin irritation. There was no evidence of developmental toxicity in rabbit fetuses at any level, and there were no apparent effects of treatment on the incidences of external, visceral, or skeletal abnormalities. The NOEL was 100 mg/kg/day for maternal toxicity and greater than 350 mg/kg/day for embryofetal toxicity and teratogenicity.

## **GENETIC TOXICOLOGY**

### **In Vitro**

This material as presented in literature has not shown genotoxic activity in a series of in vitro tests (Ames, CHO forward gene mutation, CHO sister chromatid exchange and CHO cytogenics).

### **In Vivo**

This material as presented in literature has not shown genotoxic activity in an in vivo mouse micronucleus test.

## **PHARMACOKINETICS AND METABOLISM**

### **In Vivo**

As presented in literature, the principal route of exposure is through skin, with some exposure occurring by inhalation of vapor and aerosols. Diethanolamine is not metabolized or readily eliminated from the liver or kidneys. At high tissue concentrations, diethanolamine substitutes

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for monoethanolamine in phospholipids and is methylated to form phospholipids composed of N-methyl and N,N-dimethyl diethanolamine.

## **SIGNIFICANT DATA WITH POSSIBLE RELEVANCE TO HUMANS**

There are reports that ingestion of diethanolamine (DEA) produced nervous system injury in dogs and rats. Heart and salivary gland lesions have also been observed in mice treated with DEA cutaneously and in drinking water. Rats given high doses of DEA developed anemia and testicular lesions. An increased incidence of some skeletal variations suggestive of a slight developmental delay was seen only in the fetuses of rats given 1500 mg/kg/day cutaneously which also caused significant maternal toxicity. However, no fetal malformations were observed in either rats or rabbits similarly treated. Preliminary findings from the National Toxicology Program suggest an increased incidence of liver tumors in both sexes of mice and an increased incidence of kidney tumors in male mice dermally exposed for their lifetime to DEA. The significance of these findings and their relevance to humans are not clear as DEA was not genotoxic (neither mutagenic nor clastogenic), and did not induce tumors in rats or in transgenic mice similarly treated. Additional research which is designed to provide a better understanding of the significance of these observations to humans, if any, is underway.

## **12. ECOLOGICAL INFORMATION**

### **12.1 ENVIRONMENTAL FATE**

The following information is applicable to diethanolamine.

#### **BOD (% Oxygen consumption)**

	<b>Day 5</b>	<b>Day 10</b>	<b>Day 15</b>	<b>Day 20</b>	<b>Day 28/30</b>
	11 %	35 %		100 %	

### **12.2 ECOTOXICITY**

#### **Toxicity to Micro-organisms**

Bacterial Inhibition; IC50

**Result value:** > 5000 mg/L

#### **Toxicity to Aquatic Invertebrates**

Daphnia; 48 h; LC50

**Result value:** 187 mg/L

#### **Toxicity to Fish**

Fathead Minnow; 96 h; LC50

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**Result value:** 837 mg/L

## 12.3 FURTHER INFORMATION

Chemical Oxygen Demand (COD) - measured: 1.68 mg/mg  
Theoretical Oxygen Demand (THOD) - calculated:: 1.53 mg/mg

Octanol/Water Partition Coefficient - Measured: -1.43

## 13. DISPOSAL CONSIDERATIONS

### 13.1 DISPOSAL

DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal practices must be in compliance with all Federal, State/Provincial and local laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator. DOW HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION PRESENTED HERE PERTAINS ONLY TO THE PRODUCT AS SHIPPED IN ITS INTENDED CONDITION AS DESCRIBED IN MSDS SECTION 2 (Composition/ Information on Ingredients). FOR UNUSED & UNCONTAMINATED PRODUCT, the preferred options include sending to a licensed, permitted: Incinerator or other thermal destruction device. As a service to its customers, Dow can provide names of information resources to help identify waste management companies and other facilities which recycle, reprocess or manage chemicals or plastics, and that manage used drums. Telephone Dow's Customer Information Group at 1-800-258-2436 or 1-989-832-1556 (U.S.), or 1-800-331-6451 (Canada) for further details .

## 14. TRANSPORT INFORMATION

### 14.1 U.S. D.O.T.

#### NON-BULK

**Proper Shipping Name :** OTHER REGULATED SUBSTANCES, LIQUID, NOS

**Technical Name :** CONTAINS DIETHANOLAMINE

**Hazard Class :** 9

**ID Number :** NA3082

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**Packing Group :** PG III

## **BULK**

**Proper Shipping Name :** OTHER REGULATED SUBSTANCES, LIQUID, NOS

**Technical Name :** CONTAINS DIETHANOLAMINE

**Hazard Class :** 9

**ID Number :** NA3082

**Packing Group :** PG III

**Reportable Quantity :** 119 LB

*This information is not intended to convey all specific regulatory or operational requirements/information relating to this product. Additional transportation system information can be obtained through an authorized sales or customer service representative. It is the responsibility of the transporting organization to follow all applicable laws, regulations and rules relating to the transportation of the material.*

## **15. REGULATORY INFORMATION**

### **15.1 FEDERAL/NATIONAL**

#### **OSHA HAZARD COMMUNICATION STANDARD**

This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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#### **SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTION 313**

This product contains the following substances subject to the reporting requirements of Section 313 of Title III of the Superfund Amendments and Reauthorization Act 1986 and 40 CFR Part 372.

<b>Component</b>	<b>CAS #</b>	<b>Amount</b>
N,N-Diethanolamine	111-42-2	<= 85.0000%

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**SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 TITLE III (EMERGENCY PLANNING AND COMMUNITY RIGHT TO KNOW ACT) SECTIONS 311 AND 312**

**Delayed (Chronic) Health Hazard :** Yes  
**Fire Hazard :** No  
**Immediate (Acute) Health Hazard :** Yes  
**Reactive Hazard :** No  
**Sudden Release of Pressure Hazard :** No

**TOXIC SUBSTANCES CONTROL ACT (TSCA)**

All components of this product are on the TSCA Inventory or are exempt from TSCA Inventory requirements under 40 CFR 720.30.

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**EUROPEAN INVENTORY OF EXISTING COMMERCIAL CHEMICAL SUBSTANCES (EINECS)**

The components of this product are on the EINECS inventory or are exempt from EINECS inventory requirements.

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**CEPA - DOMESTIC SUBSTANCES LIST (DSL)**

All substances contained in this product are listed on the Canadian Domestic Substances List (DSL) or are not required to be listed.

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## 15.2 STATE/LOCAL

**PENNSYLVANIA (WORKER AND COMMUNITY RIGHT TO KNOW ACT): PENNSYLVANIA HAZARDOUS SUBSTANCES LIST AND/OR PENNSYLVANIA ENVIRONMENTAL HAZARDOUS SUBSTANCE LIST:**

The following product components are cited in the Pennsylvania Hazardous Substance List and/or the Pennsylvania Environmental Substance List, and are present at levels which require reporting.

<b>Component</b>	<b>CAS #</b>	<b>Amount</b>
N,N-Diethanolamine	111-42-2	<= 85.0000%

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**PENNSYLVANIA (WORKER AND COMMUNITY RIGHT TO KNOW ACT): PENNSYLVANIA SPECIAL HAZARDOUS SUBSTANCES LIST:**

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To the best of our knowledge this product does not contain chemicals at levels which require reporting under this statute.

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## CALIFORNIA PROPOSITION 65 (SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986)

This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

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## CALIFORNIA SCAQMD RULE 443.1 (SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT RULE 443.1, LABELING OF MATERIALS CONTAINING ORGANIC SOLVENTS)

**VOC:** Vapor pressure 3.5 mmHg @ 20° C  
928 g/l  
1111 g/l of material less water and less exempted solvents.

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*This section provides selected regulatory information on this product including its components. This is not intended to include all regulations. It is the responsibility of the user to know and comply with all applicable rules, regulations and laws relating to the product being used.*

## **16. OTHER INFORMATION**

### **16.1 ADDITIONAL INFORMATION**

ADDITIONAL INFORMATION: Additional product safety information on this product may be obtained by calling Dow's Customer Information Group at 1-800-258-2436 (U.S.) or 1-800-331-6451 (Canada).

Ask for the brochure:

Ethanolamines (Family Brochure)

Ethanolamines Storage and Handling (Brochure)

### **16.2 HAZARD RATING SYSTEM**

**NFPA ratings for this product are:** H - 2      F - 1      R - 0

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*These ratings are part of a specific hazard communication program and should be disregarded where individuals are not trained in the use of this hazard rating system. You should be familiar with the hazard communication programs applicable to your workplace.*

## **16.3 RECOMMENDED USES AND RESTRICTIONS**

FOR INDUSTRY USE ONLY

## **16.4 REVISION**

Version: 5.0

Revision: 12/03/2003

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

## **16.5 LEGEND**

Bacterial/NA	Non Acclimated Bacteria
F	Fire
H	Health
IHG	Industrial Hygiene Guideline
N/A	Not available
NFPA	National Fire Protection Association
O	Oxidizer
R	Reactivity
TS	Trade secret
VOL/VOL	Volume/Volume
W	Water Reactive
W/W	Weight/Weight

*NOTICE: Dow urges each customer or recipient of this MSDS to study it carefully and consult appropriate expertise, as necessary or appropriate, to become aware of and understand the data contained in this MSDS and any hazards associated with the product. The information herein is provided in good faith and believed to be accurate as of the effective date shown above. However, no warranty, express or implied, is given., Regulatory requirements are subject to change and may differ between various locations. It is the buyer's/user's responsibility to ensure that its activities comply with all federal, state, provincial or local laws. The information presented here pertains only to the product as shipped. Since conditions for use of the product are not under the control of Dow, it is the buyer's/user's duty to determine the conditions necessary for the safe use of this product., Due to the proliferation of sources for information such as manufacturer-specific MSDSs, Dow is not and cannot be responsible for MSDSs*

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