

PETITION
USDA NATIONAL ORGANIC PROGRAM
NATIONAL LIST OF MATERIALS

McGeary Grain, Inc., under provisions of the Organic Food Production Act of 1990 (OFPA), petitions the NOSB to evaluate the following substance for inclusion (X) on or removal () from the National List.

- Material Category: Processing and Handling Material
- Common Name: 5615 Steamline Treatment
- Manufacturer: Iowa Water Management Corporation
P.O.Box E
Carlisle, IA 50047-0704
515-989-4354
- List of Use: Classified as a neutralizing amine, this treatment, containing Diethylaminoethanol, is designed to evaporate with steam and return to the boiler with condensate, maintaining the proper pH in steam and returnlines, reducing corrosion and increasing operational life of the boiler system.

The specific application of the steam generator is as an aid to producing pelletized animal feed. Steam is required to condition the bulk feed as it enters the pelletizer, and to provide lubricant and as an aid to binding as the feed is expressed through the pelletizing die. Any neutralizing amine evaporates quickly, within seconds to minutes, leaving no residual amine in pelletized feed. Steamline treatment concentration is less than 10 parts per million (PPM), and is monitored by checking steam condensate pH(7.5 to 8.5 required).

- Manufacturing Procedures: Diethylaminoethanol is blended with sodium zeolite softened water to form 5615 Steamline Treatment. Reference MSDS Section 2 for product Composition/Information.
- Review, state/private: Note USDA Food Service approval letter (Figure 1). No other approval letters have been uncovered.
- Regulatory status: 5615 Steamline Treatment approved by FDA Food

12 Dec 00

Safety and Inspection Service, for use in processing food for human consumption. See attached letter of approval (Figure 1).

- Chemical Abstract Number: 100378
- Physical Properties: See Section 9 of Material Safety Data Sheet (MSDS) attached (Figure 2).
- Safety Information: See Material Safety Data Sheet (MSDS) attached (Figure2).
- Research Information: No research information other than MSDS exists.
- Justification Statement: Steamline Treatment is required to maintain proper pH levels in the steam and condensate return lines preventing corrosion of the boiler system and associated plumbing lines. Eliminating piping corrosion will extend boiler system useful life.

Pelletized feed is required for some animals in order to maintain a uniform distribution of granular components, essential vitamins, and minerals in the total feed ration. Pelletized feed means that the animal will pick up and ingest the entire pellet and not selectively choose those feed particles it wants.

- Commercial Confidential: None
- Information Statement

12/2/00

To: Robert Pooler
USDA/AMS/TM/NOP
email: Bob.Pooler@USDA.gov

From: Co-petitioners
Date: 12/5/00

re; additional information for petitions of Cyclohexylamine, Diethylaminoethanol, and Morpholine

➤ **Justification Statement;**

Boiler water additives are essential to prevent the corrosion of steam generating and distribution systems. These additives prevent corrosion by neutralizing carbonic acid as it forms from the carbon dioxide captured within the steam. Most manufactures have one boiler system serving their entire plant and therefore producing steam for all the operating needs. These steam generating and distribution systems represent significant capital investments for food manufacturers. As an example; a 500-hp boiler costs roughly \$200,000.00. Typically, a boiler this size will provide enough steam to operate a small processing facility with one or two production lines and fruit/vegetable processing area. The larger the operation the more boiler capacity is needed. Large operations will take multiple boiler systems, which will take on the average three boiler systems. This is an investment of approximately \$600,000.00 for the boilers alone. Additional capitol investment of the entire production area is at risk if the steam is not treated to neutralize the carbonic acid. Effective and safe boiler/steam additives are vital to protect these systems. A poorly maintained system will require replacement every 5 to 8 years as opposed to lasting between 50 to 100 years. Additionally, Most State's and private insurance companies require inspections to verify that a boiler is being properly maintained. This includes a proper chemical documentation program. Worker safety is also an issue as a poorly maintained boiler system can result in steam leaks and equipment failure under load.

The only effective steam and condensate line corrosion inhibitors available are amine based with the exception or ammonium hydroxide which is the only approved steam line treatment in dairy. The code of Federal Regulations lists only three approved volatile amines; **Cyclohexylamine, Diethylaminoethanol, and Morpholine.** For the most complete and economical protection of a steam system, it is advisable to design a blend of these amines which will accommodate to the specific yet changing conditions in a boiler system. Suppliers of these materials are familiar with the conditions needed for proper distribution ratio's and will create an optimum blend for their client.

➤ **Non-synthetic Substances**

There are no approved non-synthetic substances.

➤ **Alternative Control Methods**

1. Many operations **discontinue the use of boiler water additives** only during the production of organic products minimizing the corrosive impact of not using boiler water additives. Below are some of the reasons why this is not feasible for all operations:
 - This would only be possible for manufacturers of both organic and non-organic products whose organic production represented a relatively small portion of their running time.

- This would be impractical for producers targeting a national distribution. To achieve production volumes for national distribution organic production lines would have to run virtually continuously.
 - For perspective, a 500-hp system running without boiler water additives would increase fuel requirements by about \$100,000.00. This would result in 2 additional tons of nitrogen oxide and 1 additional ton of sulfur dioxide released into the atmosphere each year. As corrosion builds up the efficiency of heat transfer decreases requiring more energy to run the boiler.
2. **Culinary steam filters** (as suggested by prior NOSB addendum Number 7 – Orlando, 1995) do not remove the volatile amines and therefore are not an alternative.
 3. Placing a **steam to steam heat exchanger** between the existing boiler water system and the production line system .
 - Not a solution for all applications, the temperature differential has to be sufficient to maintain the required temperature and pressure to serve the production system
 - The cost of installation would present a significant expense. (Average cost for a line of national distribution is \$500,000.00. Life span of equipment is 5-8 years.)

Beneficial effects to the environment from the use of the synthetic substance.

The environment benefits from the proper maintenance and boiler water treatment program. A poorly maintained boiler will increase fuel requirements as corrosion builds up and the efficiency of heat transfer decreases requiring more energy to run the boiler. These results in additional nitrogen oxide and sulfur dioxide release into the atmosphere and promotes an unsafe work environment due to deterioration and possible catastrophic steam into the work places.

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National Organic Standards Board,
c/o Robert Pooler, Agricultural Marketing Specialist,
USDA/AMS/TM/NOP, Room 2510-So., Ag Stop 0268,
P.O. Box 96456, Washington, D.C. 20090-6456.

Phone: 202/720-3252. Fax: 202/205-7808. e-mail: nlpetition@usda.gov.

National List Petition
Submitted: November 29, 2000

DIETHYLAMINOETHANOL

This Petition is submitted by the following:

Joseph Hall
Co-chair, MPPL Subcommittee, OTA
California Natural Products, Inc.
1250 E. Lanthrop Road
Lanthrop, CA 95330
phone (209)858-2525
email joehall@californianatural.com

Jim Pierce
Organic Valley / CROPP Cooperative
507 Main St. La Farge WI 54639
phone (608)625-2602 fax (608)625-4177
email jim.pierce@organicvalley.com website www.organicvalley.com.

Greg Cunningham
General Mills
201 General Mills BLvd
Minneapolis Mn 55426-1350
phone number 763 764 3058
email - greg.cunningham@genmills.com

Kelly Shea; Farm Relations Manager
Horizon Organic Dairy
6311 Horizon Lane
Boulder, CO 80308-7577
phone (719) 372-9233
email kellys@horizonorganic.com

Kim Burton
Smucker Quality Beverages, Inc.
Speedway Avenue
Chico, CA 95926
phone (530) 899-5058
email- kim.burton@jmsmucker.com

Clifford L. Jacobson
Spray Chem Chemical Company, Inc.
705 Keenan Court
Durham, CA 95938
phone (530) 895-3658
email - cliff@spraychem.com

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DIETHYLAMINOETHANOL

Processing

Category: Synthetic

Common Name: Diethylaminoethanol

Synonyms: 2-hydroxytriethylamine; diethyl(2-hydroxyethyl)amine; 2-Diethylaminoethanol; Diethylethanolamine; DEAE; N,N-Diethyl-2-hydroxyethylamine; N,N-Diethylethanolamine; N,N-Diethylaminoethanol; n-diethylaminoethanol; beta-diethylaminoethanol; 2-N,N-diethylaminoethanol; N,N-diethyl-N-(beta-hydroxyethyl)amine; beta-hydroxytriethylamine. (Attachment #D-9)

Manufacturers:

BASF

3000 Continental Drive – North
Mt. Olive, NJ 07828
Corp. Phone 973-426-2600

Elf Atochem/ Atofina

2000 Market Street
Philadelphia, PA 1903-3222
215-419-7000

Union Carbide Corporation

39 Old Ridgebury Road
Danbury, Connecticut
06817-0001 USA
800-335-8550 or
203-794-5300

List of uses, rates: Diethylaminoethanol (DEAE) is used in boiler systems to prevent carbonic acid corrosion in return lines. Typically, DEAE is used in conjunction with morpholine and cyclohexylamine. The levels of carbonate and bicarbonate in the steam and condensate will dictate the amount used. FDA-Boiler Water Additives, Title 21, Part 173 (21 CFR 173.310) (4-1-89 Edition) directs that usage cannot exceed 15 ppm in steam, and excluding us of such steam in contact with milk and milk products. Usage cannot exceed the amount required to protect the system.

Other uses: Chemical intermediate for production of emulsifiers, detergents, solubilizers, cosmetics, textile finishing agents, manufacture of drugs, fatty acid derivative, textile softeners, pharmaceuticals, antirust compositions, curing agents for resins. (attachment D-1)

Sources, mfg. Descript:

By action of ethylene chlorohydrin on diethylamine (attachment D-8)

Summary of previous reviews by state or private certification agencies:

Unknown if states have done previous reviews. Historically, certification agencies have ignored the issue of boiler chemical amines coming in contact with organic products.

Regulatory status: Approved by FDA not to exceed 15 ppm in steam, and not approved for contact with milk and milk products. See 21CFR173.310 (Attachment D-2).

CAS Number & Label: CAS No. 100-37-8 (Attachment D-3).
Requires Flammable markings. (Labels in Attachment D-4).

Physical properties, chemical mode of action, environmental impact, interaction with other materials, toxicity and persistence, effects on human health, effects on soil organisms, crops or livestock:

Physical properties: Colorless liquid with a weak, ammonia odor . HYGROSCOPIC. Melting point – 70°C, boiling point 162°C. Density .884. (See Attachment D-9)

Chemical mode of action:

Neutralizes carbonic acid in steam and steam condensates.

Environmental impact:

NIOSH does not indicate any negative environmental impacts.(See Attachment D-5)
See TOXNET research document (Attachment D-8)

Interaction with other materials:

Can react with strong oxidizers and acids

Toxicity and persistence:

See TOXNET search results. (Attachment D-8)

Effects on human health:

See TOXNET search results. (Attachment D-6 & D-8)

Effects on soil organisms:

NIOSH does not indicate any environmental hazards.
See TOXNET search results. (Attachment D-8)

Safety, MSDS, NIEHS reports:

Flammable. Gives off irritating or toxic fumes (or gases) in fire. When inhaled causes coughing labored breathing, shortness of breath, soar throat. When in contact with skin MAY BE OBSORBED, and causes redness. When ingested causes abdominal pain, Diarrhea. (attachment D-5)

Research information, reviews, bibliographies:

RESULTS OF DIALOG AND TOXLINE COMPUTER SEARCHES : Copies of the computer search printouts are included in Attachment D-7

NTP CHEMICAL REPOSITORY
DIETHYLAMINOETHANOL- IDENTIFIERS
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*CATALOG ID NUMBER: 000845
*CAS NUMBER: 100-37-8
*BASE CHEMICAL NAME: DIETHYLAMINOETHANOL
*PRIMARY NAME: DIETHYLAMINOETHANOL
*CHEMICAL FORMULA: C6H15NO
*STRUCTURAL FORMULA:
*WLN: Q2N2&2
*SYNONYMS:
2 - (DIETHYLAMINO) ETHANOL
DEAE
N-DIETHYLAMINOETHANOL
BETA-DIETHYLAMINOETHANOL
2-N-DIETHYLAMINOETHANOL
BETA-DIETHYLAMINOETHYL ALCOHOL
DIETHYLETHANOLAMINE
N,N-DIETHYLETHANOLAMINE
N,N-DIETHYL-N- (BETA-HYDROXYETHYL) AMINE
2-HYDROXYTRIETHYLAMINE
BETA-HYDROXYTRIETHYLAMINE
DIETHYL ETHANOLAMINE

- PHYSICAL CHEMICAL DATA
=====

*PHYSICAL DESCRIPTIONS: Literature: Colorless liquid
*MOLECULAR WEIGHT: 117.19
*SPECIFIC GRAVITY: 0.88-0.89 @ 20/20 C
*DENSITY: Not available
*MP (DEG C): -70
*BP (DEG C): 163
*SOLUBILITIES:
WATER : VERY SOLUBLE
DMSO : Soluble
95% ETHANOL : SOLUBLE
METHANOL : Not available
ACETONE : SOLUBLE
TOLUENE : Not available
OTHER SOLVENTS: PETROLEUM ETHER: SOLUBLE
ETHER : SOLUBLE

BENZENE: SOLUBLE

*VOLATILITY: Vapor pressure: 21 mm Hg @ 20 C Vapor density: 4.03

*FLAMMABILITY (FLASH POINT):

The flash point of this chemical is 60 C (140 F). It is combustible. Fires involving this material should be controlled using a dry chemical, carbon dioxide or Halon extinguisher.

*UEL: Not available

LEL: Not available

*REACTIVITY: This compound can react with strong oxidizers and acids.

*STABILITY: This chemical is sensitive to moisture.

*OTHER PHYSICAL DATA:

Hygroscopic
Weak ammonia odor

-TOXICITY

=====

*NIOSH REGISTRY NUMBER: KK5075000

*TOXICITY: (abbreviations)

typ. dose	mode	specie	amount	unit	other
LD50	ORL	RAT	1300	MG/KG	
LD50	IPR	RAT	1220	MG/KG	
LD50	IPR	MUS	308	MG/KG	
LD50	SCU	MUS	1561	MG/KG	
LD50	IVN	MUS	188	MG/KG	

*AQTX/TLM96: Not available

*SAX TOXICITY EVALUATION: THR=MOD VIA ORAL AND DERMAL ROUTES. CAUSES TOXIC EFF

*CARCINOGENICITY: Not available

*MUTATION DATA: Not available

*TERATOGENICITY: Not available

*STANDARDS, REGULATIONS & RECOMMENDATIONS:

OSHA: Federal Register (1/19/89) and 29 CFR 1910.1000 Subpart Z

Transitional Limit: PEL-TWA 10 ppm (skin) [610]

Final Limit: PEL-TWA 10 ppm (skin) [610]

ACGIH: TLV-TWA 10 ppm (skin) [610]

NIOSH Criteria Document:

NFPA Hazard Rating: Health (H): 3

Flammability (F): 2

Reactivity (R): 0

H3: Materials extremely hazardous to health but areas may be entered with extreme care (see NFPA for details).

F2: Materials which must be moderately heated before ignition will occur (see NFPA for details).

R0: Materials which are normally stable even under fire exposure conditions and which are not reactive with water (see NFPA for details).

*OTHER TOXICITY DATA:

Skin and Eye Irritation Data:

skn-rbt 10 mg/24H

skn-rbt 500 mg open MLD

eye-rbt 5 mg SEV

Status: "NIOSH Manual of Analytical Methods" Vol 4 270, Vol 5, No. S140

EPA TSCA 8(a) Preliminary Assessment Information Proposed Rule

-OTHER DATA (Regulatory)
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*PROPER SHIPPING NAME (IATA): Diethylaminoethanol

*UN/ID NUMBER: UN2686

*HAZARD CLASS: 3 SUBSIDIARY RISK: None PACKING GROUP: III

*LABELS REQUIRED: Flammable liquid

*PACKAGING: PASSENGER: PKG. INSTR.: 309, Y309	MAXIMUM QUANTITY: 60 L, 10 L
CARGO : PKG. INSTR.: 310	MAXIMUM QUANTITY: 220 L

*SPECIAL PROVISIONS: None

*USES:

Chemical intermediate for production of emulsifiers, detergents, solubilizers, cosmetics, textile finishing agents, manufacture of drugs, fatty acid derivative, textile softeners, pharmaceuticals, antirust compositions, curing agents for resins.

*COMMENTS:

-HANDLING PROCEDURES
 =====

*ACUTE/CHRONIC HAZARDS:

This compound causes irritation on contact. When heated to decomposition it emits toxic fumes.

*MINIMUM PROTECTIVE CLOTHING:

If Tyvek-type disposable protective clothing is not worn during handling of this chemical, wear disposable Tyvek-type sleeves taped to your gloves.

*RECOMMENDED GLOVE MATERIALS: P

The following gloves show the best resistance based on permeation testing. It is recommended that two different glove types be used for best protection. However, if this chemical makes direct contact with your glove, or if a tear, puncture or hole develops, remove them at once.

SUGGESTED GLOVES (RAD): Viton, Butyl rubber, Nitrile, PVA

*RECOMMENDED RESPIRATOR:

Where the neat test chemical is weighed and diluted, wear a NIOSH-approved half face respirator equipped with an organic vapor/acid gas cartridge (specific for organic vapors, HCl, acid gas and SO₂) with a dust/mist filter.

Splash proof safety goggles should be worn while handling this chemical. Alternatively, a full face respirator, equipped as above, may be used to provide simultaneous eye and respiratory protection.

*OTHER: Not available

*STORAGE PRECAUTIONS:

You should store this chemical under refrigerated temperatures, and protect it from moisture.

*SPILLS AND LEAKAGE:

If you should spill this chemical, use absorbent paper to pick up all liquid spill material. Seal the absorbent paper, as well as any of your clothing which may be contaminated, in a vapor-tight plastic bag for eventual disposal. Wash any surfaces you may have contaminated with a strong soap and water solution. Do not reenter the contaminated area until the Safety Officer (or other responsible person) has verified

that the area has been properly cleaned.

***DISPOSAL AND WASTE TREATMENT:**

You should dispose of all waste and contaminated materials associated with this chemical as specified by existing local, state and federal regulations concerning hazardous waste disposal. It is suggested that your contaminated materials should be destroyed by incineration in a special, high temperature (>2000 degrees F), chemical incinerator facility.

-EMERGENCY PROCEDURES

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***SKIN CONTACT:**

IMMEDIATELY flood affected skin with water while removing and isolating all contaminated clothing. Gently wash all affected skin areas thoroughly with soap and water.

IMMEDIATELY call a hospital or poison control center even if no symptoms (such as redness or irritation) develop.

IMMEDIATELY transport the victim to a hospital for treatment after washing the affected areas.

***INHALATION:**

IMMEDIATELY leave the contaminated area; take deep breaths of fresh air. If symptoms (such as wheezing, coughing, shortness of breath, or burning in the mouth, throat, or chest) develop, call a physician and be prepared to transport the victim to a hospital.

Provide proper respiratory protection to rescuers entering an unknown atmosphere. Whenever possible, Self-Contained Breathing Apparatus (SCBA) should be used; if not available, use a level of protection greater than or equal to that advised under Respirator Recommendation.

***EYE CONTACT:**

First check the victim for contact lenses and remove if present. Flush victim's eyes with water or normal saline solution for 20 to 30 minutes while simultaneously calling a hospital or poison control center.

Do not put any ointments, oils, or medication in the victim's eyes without specific instructions from a physician.

IMMEDIATELY transport the victim after flushing eyes to a hospital even if no symptoms (such as redness or irritation) develop.

***INGESTION:**

DO NOT INDUCE VOMITING. Corrosive chemicals will destroy the membranes of the mouth, throat, and esophagus and, in addition, have a high risk of being aspirated into the victim's lungs during vomiting which increases the medical problems.

If the victim is conscious and not convulsing, give 1 or 2 glasses of water to dilute the chemical and IMMEDIATELY call a hospital or poison control center. IMMEDIATELY transport the victim to a hospital.

If the victim is convulsing or unconscious, do not give anything by mouth, ensure that the victim's airway is open and lay the victim on his/her side with the head lower than the body. DO NOT INDUCE VOMITING. Transport the victim IMMEDIATELY to a hospital.

***SYMPTOMS:**

Symptoms of exposure to this compound may include irritation of the eyes, skin and respiratory tract, nausea and vomiting.

***FIREFIGHTING:**

This compound is not very flammable but any fire involving this compound may produce dangerous vapors. You should evacuate the area. All firefighters should wear full-body protective clothing and use self-contained breathing apparatuses.

You should extinguish any fires involving this chemical with a dry chemical, carbon dioxide, foam, or halon extinguisher.

-SOURCES

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*SOURCES:

- Lewis, R.J., Sr. and R.L. Tatken, Eds. Registry of Toxic Effects of Chemical Substances. DHEW (NIOSH) Publication No. 79-100. National Institute for Occupational Safety and Health. Cincinnati, OH. 1979. KK5075000.
- Windholz, M., Ed. The Merck Index. 9th Ed. Merck and Co. Rahway, NJ. 1976. PP.411 NO.3083.
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- Weast, R.C. and M.A. Astle, Eds. CRC Handbook of Chemistry and Physics. 60th Ed. CRC Press, Inc. Boca Raton, FL. 1982. PP.C-297 NO.E358.
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- Proctor, N.H. and J.P. Hughes. Chemical Hazards of the Workplace. J.B. Lippincott. Philadelphia. 1978. PP.218.
- Hawley, G.G., Ed. The Condensed Chemical Dictionary. 10th Ed. Van Nostrand Reinhold. New York. 1981. PP.343.
- Steere, N.V., Ed. Handbook of Laboratory Safety. 2nd Ed. CRC Press, Inc. Cleveland, OH. 1971. PP.756 NO.374.
- Oak Ridge National Laboratory. Environmental Teratogen Information Center (ETIC), Bibliographic Data Base. Oak Ridge National Laboratory. Oak Ridge, TN. NOT LISTED.
- Aldrich Chemical Company. Aldrich Catalog/Handbook of Fine Chemicals. Aldrich Chemical Co., Inc. Milwaukee, WI. 1980. PP.338 NO.D9,400-3.
- Oak Ridge National Laboratory. Environmental Mutagen Information Center (EMIC), Bibliographic Data Base. Oak Ridge National Laboratory. Oak Ridge, TN. NOT LISTED.
- Occupational Safety and Health Administration. Tentative OSHA Listing of Confirmed and Suspected Carcinogens by Category. Occupational Safety and Health Administration. Washington, DC. 1979. NOT LISTED.
- [610] Clansky, Kenneth B., Ed. Suspect Chemicals Sourcebook: A Guide to Industrial Chemicals Covered Under Major Federal Regulatory and Advisory Programs. Roytech Publications, Inc. Burlingame, CA. 1990. Section 3, p. 34.
- [620] United States National Toxicology Program. Chemical Status Report. NTP Chemtrack System. Research Triangle Park, NC. November 6, 1990. Not listed.
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Sodium metasilicate.....
 Sodium nitrate.....
 Sodium phosphate (mono-, di-, tri-)
 Sodium polyacrylate.....
 Sodium polymethacrylate.....
 Sodium silicate.....
 Sodium sulfate.....
 Sodium sulfite (neutral or
 alkaline).

[[Page 130]]

Sodium tripolyphosphate.....
 Sorbitol anhydride esters: a
 mixture consisting of sorbitan
 monostearate as defined in Sec.
 172.842 of this chapter;
 polysorbate 60 ((polyoxyethylene
 (20) sorbitan monostearate)) as
 defined in Sec. 172.836 of this
 chapter; and polysorbate 20
 ((polyoxyethylene (20) sorbitan
 monolaurate)), meeting the
 specifications of the Food
 Chemicals Codex, 4th ed. (1996),
 pp. 306-307, which is incorporated
 by reference in accordance with 5
 U.S.C. 552(a) and 1 CFR part 51.
 Copies are available from the
 National Academy Press, 2101
 Constitution Ave. NW., Box 285,
 Washington, DC 20055 (Internet
<http://www.nap.edu>), or may be
 examined at the Center for Food
 Safety and Applied Nutrition's
 Library, Food and Drug
 Administration, 200 C St. SW., rm.
 3321, Washington, DC, or at the
 Office of the Federal Register,
 800 North Capitol St. NW., suite
 700, Washington, DC.
 Tannin (including quebracho
 extract).
 Tetrasodium EDTA.....
 Tetrasodium pyrophosphate.....

The mixture is used as an
 anticorrosive agent in steam
 boiler distribution systems, with
 each component not to exceed 15
 parts per million in the steam.

Substances	Limitations
Cyclohexylamine.....	Not to exceed 10 parts per million in steam, and excluding use of such steam in contact with milk and milk products.
Diethylaminoethanol.....	Not to exceed 15 parts per million in steam, and excluding use of such steam in contact with milk and milk products.
Hydrazine.....	Zero in steam.
Morpholine.....	Not to exceed 10 parts per

DIETHYLAMINOETHANOL

TYPE OF PRODUCT: Volatile Amine, Alkyl Alkanol Amine

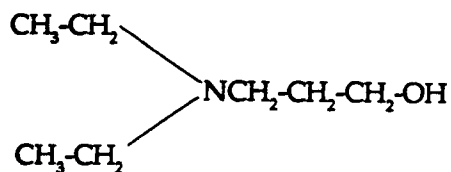
FUNCTION: Prevent Carbonic Acid Corrosion in Return Lines

COMMON NAME AND ABBREVIATION: Diethylaminoethanol (DEAE or DEEA)

OTHER NAMES: Ethanol-2-(Diethylamino)
N,N-Diethylethanolamine
2-Hydroxy Triethylamine

FORMULA: $C_6H_{15}NO$ or $(C_2H_5)_2NC_2H_4OH$

STRUCTURE: Tertiary Amine, Alkanolamine



C.A.S. NAME AND NUMBER: 2-(Diethylamino)ethanol - 100-37-8

SPECIFIC GRAVITY: 0.885 **MOLECULAR WEIGHT:** 117

FLASH POINT: 125° F. **FREEZING POINT:** -80° F.

OTHER SPECIFICATIONS ARE SHOWN ON THE SUMMARY SHEET

SUPPLIERS: Atochem, BASF, Carbide.

COMMENTS: Now classified as a corrosive liquid. Water should not exceed 0.2%. DMEA is similar to DEAE but does not have FDA approval.


BetzDearborn
**BETZDEARBORN MATERIAL
SAFETY DATA SHEET**

NEED UPDATE

 EFFECTIVE DATE: 15-MAY-1997
 PRINTED DATE: 3-SEP-1999

1) CHEMICAL PRODUCT AND COMPANY IDENTIFICATION
PRODUCT NAME : STEAMATE NA700
PRODUCT APPLICATION AREA: CONDENSATE RETURN LINE TREATMENT.
COMPANY ADDRESS:

 BetzDearborn
 4636 Somerton Road, Trevose, PA 19053
 Information phone number (215) - 355-3300

EMERGENCY TELEPHONE (HEALTH/ACCIDENT): (800)-877-1940 (USA)
2) COMPOSITION / INFORMATION ON INGREDIENTS

Information for specific product ingredients as required by the U.S. OSHA HAZARD COMMUNICATION STANDARD is listed. Refer to additional sections of this MSDS for our assessment of the potential hazards of this formulation.

HAZARDOUS INGREDIENTS:

CAS#	CHEMICAL NAME
100-37-8	DIETHYLAMINOETHANOL (DEAE) Combustible liquid; corrosive (eyes and skin); irritant (respiratory); absorbed by skin
110-91-8	MORPHOLINE Flammable liquid; corrosive; toxic (by skin absorption); potential liver and kidney toxin

No component is considered to be a carcinogen by the National Toxicology Program, the International Agency for Research on Cancer, or the Occupational Safety and Health Administration at OSHA thresholds for carcinogens.

PRODUCT NAME : STEAMATE NA700
EFFECTIVE DATE: 15-MAY-1997

3) HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DANGER

Severe irritant to the skin. Absorbed by skin. Potential sensitizer. Corrosive to the eyes. Irritation of the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

DOT hazard is not applicable
 Emergency Response Guide is not applicable
 Odor: Amine; Appearance: Colorless To Yellow, Liquid

Fire fighters should wear positive pressure self-contained breathing apparatus(full face-piece type). Proper fire-extinguishing media: dry chemical, carbon dioxide, or foam--Water spray should be used only to cool fire-exposed containers and disperse vapors.

POTENTIAL HEALTH EFFECTS

ACUTE SKIN EFFECTS:

Primary route of exposure; Severe irritant to the skin. Absorbed by skin. Potential sensitizer.

ACUTE EYE EFFECTS:

Corrosive to the eyes.

ACUTE RESPIRATORY EFFECTS:

Primary route of exposure;Irritation of the upper respiratory tract. Prolonged exposure may cause dizziness and headache.

INGESTION EFFECTS:

May cause severe gastrointestinal irritation with possible nausea, vomiting, headache, dizziness, unconciousness and injury to kidneys and liver.

TARGET ORGANS:

Prolonged or repeated exposures may cause toxicity to the liver, kidney and/or nervous system.

MEDICAL CONDITIONS AGGRAVATED:

Not known.

SYMPTOMS OF EXPOSURE:

Inhalation may cause lightheadedness, slurred speech, nausea, and/or vomiting (pulmonary edema may result). Skin contact can cause severe irritation or burns.

PRODUCT NAME : STEAMATE NA700
EFFECTIVE DATE: 15-MAY-1997

4) FIRST AID MEASURES

SKIN CONTACT:

Remove contaminated clothing. Wash exposed area with a large quantity of soap solution or water for 15 minutes.

EYE CONTACT:

Immediately flush eyes with water for 15 minutes. Immediately contact a physician for additional treatment.

INHALATION:

Remove victim from contaminated area to fresh air. Apply appropriate first aid treatment as necessary.

INGESTION:

Do not feed anything by mouth to an unconscious or convulsive victim. Do not induce vomiting. Immediately contact physician. Dilute contents of stomach using 3-4 glasses milk or water.

5) FIRE FIGHTING MEASURES

FIRE FIGHTING INSTRUCTIONS:

Fire fighters should wear positive pressure self-contained breathing apparatus (full face-piece type).

EXTINGUISHING MEDIA:

dry chemical, carbon dioxide, or foam--Water spray should be used only to cool fire-exposed containers and disperse vapors.

HAZARDOUS DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

FLASH POINT:

> 200F > 93C P-M(CC)

6) ACCIDENTAL RELEASE MEASURES

PROTECTION AND SPILL CONTAINMENT:

Ventilate area. Use specified protective equipment. Contain and absorb on absorbent material. Place in waste disposal container. Flush area with water. Wet area may be slippery. Spread sand/grit.

DISPOSAL INSTRUCTIONS:

Water contaminated with this product may be sent to a sanitary sewer treatment facility, in accordance with any local agreement, a permitted waste treatment facility or discharged under a permit. Product as is - Incinerate or land dispose in an approved landfill.

7) HANDLING AND STORAGE

HANDLING:

Alkaline. Corrosive(Eyes). Do not mix with acidic material.

STORAGE:

Keep containers closed when not in use. Store in cool ventilated location. Store away from oxidizers.

PRODUCT NAME : STEAMATE NA700
EFFECTIVE DATE: 15-MAY-1997

8) EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS

CHEMICAL NAME

DIETHYLAMINOETHANOL (DEAE)
 PEL (OSHA): 10 PPM(SKIN)
 TLV (ACGIH): 2 PPM(SKIN)

MORPHOLINE

PEL (OSHA): 20 PPM-SKIN(30PPM-STEL)
 TLV (ACGIH): 20 PPM-SKIN(30PPM-STEL)

ENGINEERING CONTROLS:

Adequate ventilation to maintain air contaminants below exposure limits.

PERSONAL PROTECTIVE EQUIPMENT:

Use protective equipment in accordance with 29CFR 1910 Subpart I

RESPIRATORY PROTECTION:

A RESPIRATORY PROTECTION PROGRAM THAT MEETS OSHA'S 29 CFR 1910.134 AND ANSI Z88.2 REQUIREMENTS MUST BE FOLLOWED WHENEVER WORKPLACE CONDITIONS WARRANT A RESPIRATOR'S USE.

USE AIR PURIFYING RESPIRATORS WITHIN USE LIMITATIONS ASSOCIATED WITH THE EQUIPMENT OR ELSE USE SUPPLIED AIR-RESPIRATORS.

If air-purifying respirator use is appropriate, use a respirator with organic vapor cartridges and dust/mist prefilters.

SKIN PROTECTION:

gauntlet-type rubber gloves, chemical resistant apron-- Wash off after each use. Replace as necessary.

EYE PROTECTION:

splash proof chemical goggles, face shield

9) PHYSICAL AND CHEMICAL PROPERTIES

Specific Grav.(70F,21C)	0.987	Vapor Pressure (mmHG)	~ 18.0
Freeze Point (F)	< -30	Vapor Density (air=1)	> 1.00
Freeze Point (C)	< -34		
Viscosity(cps 70F,21C)	28	% Solubility (water)	100.0

Odor	Amine
Appearance	Colorless To Yellow
Physical State	Liquid
Flash Point	P-M(CC) > 200F > 93C
pH As Is (approx.)	12.2
Evaporation Rate (Ether=1)	< 1.00

NA = not applicable ND = not determined

PRODUCT NAME : STEAMATE NA700
EFFECTIVE DATE: 15-MAY-1997

10) STABILITY AND REACTIVITY

STABILITY:

Stable under normal storage conditions.

HAZARDOUS POLYMERIZATION:

Will not occur.

INCOMPATIBILITIES:

May react with strong oxidizers.

DECOMPOSITION PRODUCTS:

Thermal decomposition (destructive fires) yields elemental oxides.

BETZDEARBORN INTERNAL PUMPOUT/CLEANOUT CATEGORIES:

"B"

11) TOXICOLOGICAL INFORMATION

Oral LD50 RAT: 2,450 mg/kg

NOTE - Estimated value

Dermal LD50 RABBIT: 1,930 mg/kg

NOTE - Estimated value

12) ECOLOGICAL INFORMATION

AQUATIC TOXICOLOGY

Fathead Minnow 96 Hour Static Screen with 48-Hour Renewal
pH of test solutions was adjusted to a level of 6-9.

100% Mortality: 5000 mg/L

0% Mortality: 2000 mg/L

Daphnia magna 48 Hour Static Renewal Bioassay
pH of test solutions was adjusted to a level of 6-9.

LC50: 403 mg/L

No Effect Level: 178.5 mg/L

BIODEGRADATION

COD (mg/gm): 1063 Calculated

TOC (mg/gm): 292 Calculated

BOD-5 (mg/gm): 0 Calculated

BOD-28 (mg/gm): 300 Calculated

International Chemical Safety Cards

1,2-DIETHYLAMINOETHANOL

ICSC: 0257

1,2-DIETHYLAMINOETHANOL N,N-Diethylethanolamine Diethylaminoethyl alcohol $(C_2H_5)_2NC_2H_4OH$ Molecular mass: 117.2			
CAS # 100-37-8 RTECS # KK5075000 ICSC # 0257 UN # 2686 EC # 603-048-00-6			
TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Powder, alcohol-resistant foam, water spray, carbon dioxide.
EXPLOSION	Above 52°C explosive vapour/air mixtures may be formed.	Above 52°C closed system, ventilation.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• INHALATION	Cough. Laboured breathing. Nausea. Shortness of breath. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention.
• SKIN	MAY BE ABSORBED! Redness. skin burns. Pain.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• EYES	Redness. Pain. Blurred vision.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.
SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING	
Collect leaking and spilled liquid in sealable containers as far as possible. Wash away remainder with plenty of water (extra personal protection: A/P2 filter respirator for organic vapour and harmful dust).	Separated from oxidants, acids, acid chlorides, isocyanates. Dry.	Xi symbol R: 36/37/38 S: 28 UN Haz Class: 3 UN Pack Group: III	
SEE IMPORTANT INFORMATION ON BACK			
ICSC: 0257		Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993	

International Chemical Safety Cards

1,2-DIETHYLAMINOETHANOL

ICSC: 0257

I M P O R T A N T D A T A	<p>PHYSICAL STATE; APPEARANCE: COLOURLESS HYGROSCOPIC LIQUID , WITH CHARACTERISTIC ODOUR.</p> <p>PHYSICAL DANGERS:</p> <p>CHEMICAL DANGERS: On combustion, forms toxic gases (nitrogen oxides). Reacts violently with oxidants, acids, acid chlorides, and isocyanates. Attacks light metals and copper.</p> <p>OCCUPATIONAL EXPOSURE LIMITS (OELs): TLV (as TWA): 10 ppm; 48 mg/m³ (skin) (ACGIH 1992-1993). MAK: 10 ppm; 50 mg/m³; H (1992).</p>	<p>ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation, through the skin and by ingestion.</p> <p>INHALATION RISK: A harmful contamination of the air can be reached rather quickly on evaporation of this substance at 20°C.</p> <p>EFFECTS OF SHORT-TERM EXPOSURE: The substance irritates the eyes, the skin and the respiratory tract. Inhalation of vapour and/or fumes may cause lung oedema (see Notes). The substance may cause effects on the nervous system.</p> <p>EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:</p>
PHYSICAL PROPERTIES	<p>Boiling point: 163°C Melting point: -70°C Relative density (water = 1): 0.883 Solubility in water: miscible Vapour pressure, kPa at 20°C: 0.19 Relative vapour density (air = 1): 4.03</p>	<p>Relative density of the vapour/air-mixture at 20°C (air = 1): 1.01 Flash point: 52°C (c.c.) Auto-ignition temperature: 250°C Explosive limits, vol% in air: 6.7-11.7 Octanol/water partition coefficient as log Pow: 0.46</p>
ENVIRONMENTAL DATA		
NOTES		
<p>Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. Immediate administration of an appropriate spray, by a doctor or a person authorized by him/her, should be considered. The odour warning when the exposure limit value is exceeded is insufficient.</p> <p style="text-align: right;">NFPA Code: H 3; F 2; R 0;</p>		
ADDITIONAL INFORMATION		
ICSC: 0257		1,2-DIETHYLAMINOETHANOL
© IPCS, CEC, 1993		
IMPORTANT LEGAL NOTICE:	<p>Neither the CEC or the IPCS nor any person acting on behalf of the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use.</p>	

DIETHYLAMINOETHANOL

CASRN: 100-37-8

*For other data, click on the Table of Contents***Human Health Effects:****Human Toxicity Excerpts:****/Diethylaminoethanol/** can also produce nausea and vomiting.

[Sullivan, J.B. Jr., G.R. Krieger (eds.). Hazardous Materials Toxicology-Clinical Principles of Environmental Health. Baltimore, MD: Williams and Wilkins, 1992. 1106]**PEER REVIEWED**

An attempt by a laboratory worker to remove animals from an inhalation chamber containing approx 100 ppm resulted in nausea and vomiting within 5 min after a fleeting exposure; no irritation of the eyes or throat was noted during this brief exposure. Other persons in the same room also complained of a nauseating odor but showed no ill effects.

[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I,II, III. Cincinnati, OH: ACGIH, 1991. 462]**PEER REVIEWED**

Environmental samples were analyzed for **diethylaminoethanol** at the Johnson Museum, Cornell University, Ithaca, New York in January 1983. The survey was requested by the 40 employees because of eye irritation and dermatitis. **Diethylaminoethanol** was used to humidify the air in the museum. Air samples and bulk samples were analyzed for **diethylaminoethanol**. Medical interviews were conducted. Of the 14 samples taken, only 2 had detectable amounts of **diethylaminoethanol**. The two concentrations were 0.05 and 0.04 mg/cu m. This was below the OSHA standard of 50 mg/cu m. The two bulk samples contained about 30 mg per square meter of exposed area. A total of 46% of the employees complained of eye irritation, 37% complained of skin irritation, and 17% complained of headache, nose and throat irritation, or dizziness. Six females reported gynecological problems. /It was/ concluded that contact with surfaces coated with condensed **diethylaminoethanol** may be responsible for some of the irritant effects. It is recommended that **diethylaminoethanol** be wiped from surfaces, or the use of **diethylaminoethanol** be discontinued.

[NIOSH/ Hazard Evaluations and Technical Assistance Branch; Report No. HETA-83-020-1351, 11 pp (1983)]**PEER REVIEWED**

In response to a request from a management representative an evaluation was made of an outbreak of illness at a /electronics manufacturing plant/ located in Cincinnati, Ohio. The company manufactured electrical circuit boards and electrical equipment for the commercial and defense industries. In September of 1988 two boilers were prepared for operation by adding corrosion inhibiting chemicals, **diethylaminoethanol** and cyclohexylamine. Steam produced by the boilers was used for humidity in the work area. Symptoms consistent with acute toxic effects of **diethylaminoethanol** and cyclohexylamine were noted in 65 of the employees. These included nausea, dizziness, vomiting, and eye, nose, and throat irritation. A significantly higher risk of having several symptoms was noted among the employees in the areas humidified with boiler steam than among employees in the nonboiler steam humidified areas. Employee exposures to metals from solder fumes and methyl-ethyl-ketone were all below established-limits. There was friable asbestos insulation exposed on one boiler. /It was/ concluded that the exposures to the two corrosion inhibiting chemicals were responsible for the workers' symptoms.

[NIOSH; Health Hazard Evaluation Report HETA 89-057-2003 (1991)]**PEER REVIEWED**

On March 23, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from Boehringer Ingelheim, Ltd, Ridgefield, Connecticut. The request stated that approximately 15 employees in the office support area of a production building had been experiencing rashes since the beginning of March 1981. Environmental sampling did not reveal any **diethylaminoethanol** in air samples. However, results of sampling suggested the presence

of a conjugated amine which possesses acidic properties. The specific agent could not be identified. Skin examinations revealed an irritant-type rash on the exposed areas of the face neck and hands. The distribution of the rash was consistent with and suggestive of a phototoxic skin reaction. Both the environmental and medical evaluations indicated the source of the dermatitis to be the air-handling system. However, no specific etiologic agent has been identified. The information in the body of the full report suggests that a condensation or reaction product of **diethylaminoethanol** was likely responsible for the reported symptoms.

[NIOSH; Health Hazard Evaluation Report No. HETA-81-247-958 (1983)]**PEER REVIEWED**

Skin, Eye and Respiratory Irritations:

Diethylaminoethanol vapor is a skin, eye, and respiratory irritant.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Medical Surveillance:

Employees should be screened for history of certain medical conditions which might place the employee at increased risk from **diethylaminoethanol** exposure. /These are/ chronic respiratory disease ... skin disease ... /and/ eye disease. ... Any employee developing the above-listed conditions should be referred for further medical examination.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Populations at Special Risk:







In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of **diethylaminoethanol** might cause exacerbation of symptoms due to its irritant properties. ... Persons with pre-existing skin disorders may be more susceptible to the effects of this agent. ... Those with pre-existing eye problems may be at increased risk from exposure.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

International Chemical Safety Cards

1,2-DIETHYLAMINOETHANOL

ICSC: 0257

				
<p>1,2-DIETHYLAMINOETHANOL N,N-Diethylethanolamine Diethylaminoethyl alcohol $(C_2H_5)_2NC_2H_4OH$ Molecular mass: 117.2</p>				
<p>CAS # 100-37-8 RTECS # KK5075000 ICSC # 0257 UN # 2686 EC # 603-048-00-6</p>				

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Flammable. Gives off irritating or toxic fumes (or gases) in a fire.	NO open flames.	Powder, alcohol-resistant foam, water spray, carbon dioxide.
EXPLOSION	Above 52°C explosive vapour/air mixtures may be formed.	Above 52°C closed system, ventilation.	In case of fire: keep drums, etc., cool by spraying with water.
EXPOSURE			
• INHALATION	Cough. Laboured breathing. Nausea. Shortness of breath. Sore throat. Vomiting.	Ventilation, local exhaust, or breathing protection.	Fresh air, rest. Half-upright position. Artificial respiration if indicated. Refer for medical attention.
• SKIN	MAY BE ABSORBED! Redness. skin burns. Pain.	Protective gloves. Protective clothing.	Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention.
• EYES	Redness. Pain. Blurred vision.	Face shield.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
• INGESTION	Abdominal pain. Diarrhoea (further see Inhalation).	Do not eat, drink, or smoke during work.	Rinse mouth. Give plenty of water to drink. Refer for medical attention.

SPILLAGE DISPOSAL	STORAGE	PACKAGING & LABELLING
Collect leaking and spilled liquid in sealable containers as far as possible. Wash away remainder with plenty of water (extra personal protection: A/P2 filter respirator for organic vapour and harmful dust).	Separated from oxidants, acids, acid chlorides, isocyanates. Dry.	Xi symbol R: 36/37/38 S: 28 UN Haz Class: 3 UN Pack Group: III

SEE IMPORTANT INFORMATION ON BACK

ICSC: 0257

Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities © IPCS CEC 1993 No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and IDLH values.

International Chemical Safety Cards

1,2-DIETHYLAMINOETHANOL

ICSC: 0257

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ADDITIONAL INFORMATION		
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DIETHYLAMINOETHANOL

CASRN: 100-37-8

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Environmental samples were analyzed for **diethylaminoethanol** at the Johnson Museum, Cornell University, Ithaca, New York in January 1983. The survey was requested by the 40 employees because of eye irritation and dermatitis. **Diethylaminoethanol** was used to humidify the air in the museum. Air samples and bulk samples were analyzed for **diethylaminoethanol**. Medical interviews were conducted. Of the 14 samples taken, only 2 had detectable amounts of **diethylaminoethanol**. The two concentrations were 0.05 and 0.04 mg/cu m. This was below the OSHA standard of 50 mg/cu m. The two bulk samples contained about 30 mg per square meter of exposed area. A total of 46% of the employees complained of eye irritation, 37% complained of skin irritation, and 17% complained of headache, nose and throat irritation, or dizziness. Six females reported gynecological problems. /It was/ concluded that contact with surfaces coated with condensed **diethylaminoethanol** may be responsible for some of the irritant effects. It is recommended that **diethylaminoethanol** be wiped from surfaces, or the use of **diethylaminoethanol** be discontinued.

[NIOSH/ Hazard Evaluations and Technical Assistance Branch; Report No. HETA-83-020-1351, 11 pp (1983)] **PEER REVIEWED**

In response to a request from a management representative an evaluation was made of an outbreak of illness at a /electronics manufacturing plant/ located in Cincinnati, Ohio. The company manufactured electrical circuit boards and electrical equipment for the commercial and defense industries. In September of 1988 two boilers were prepared for operation by adding corrosion inhibiting chemicals, **diethylaminoethanol** and cyclohexylamine. Steam produced by the boilers was used for humidity in the work area. Symptoms consistent with acute toxic effects of **diethylaminoethanol** and cyclohexylamine were noted in 65 of the employees. These included nausea, dizziness, vomiting, and eye, nose, and throat irritation. A significantly higher risk of having several symptoms was noted among the employees in the areas humidified with boiler steam than among employees in the nonboiler steam humidified areas. Employee exposures to metals from solder fumes and methyl-ethyl-ketone were all below established-limits. There was friable asbestos insulation exposed on one boiler. /It was/ concluded that the exposures to the two corrosion inhibiting chemicals were responsible for the workers' symptoms.

[NIOSH; Health Hazard Evaluation Report HETA 89-057-2003 (1991)] **PEER REVIEWED**

On March 23, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request for a Health Hazard Evaluation from Boehringer Ingelheim, Ltd, Ridgefield, Connecticut. The request stated that approximately 15 employees in the office support area of a production building had been experiencing rashes since the beginning of March 1981. Environmental sampling did not reveal any **diethylaminoethanol** in air samples. However, results of sampling suggested the presence

of a conjugated amine which possesses acidic properties. The specific agent could not be identified. Skin examinations revealed an irritant-type rash on the exposed areas of the face neck and hands. The distribution of the rash was consistent with and suggestive of a phototoxic skin reaction. Both the environmental and medical evaluations indicated the source of the dermatitis to be the air-handling system. However, no specific etiologic agent has been identified. The information in the body of the full report suggests that a condensation or reaction product of **diethylaminoethanol** was likely responsible for the reported symptoms.

[NIOSH; Health Hazard Evaluation Report No. HETA-81-247-958 (1983)]**PEER REVIEWED**

Skin, Eye and Respiratory Irritations:

Diethylaminoethanol vapor is a skin, eye, and respiratory irritant.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Medical Surveillance:

Employees should be screened for history of certain medical conditions which might place the employee at increased risk from **diethylaminoethanol** exposure. /These are/ chronic respiratory disease ... skin disease ... /and/ eye disease. ... Any employee developing the above-listed conditions should be referred for further medical examination.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Populations at Special Risk:

In persons with impaired pulmonary function, especially those with obstructive airway diseases, the breathing of **diethylaminoethanol** might cause exacerbation of symptoms due to its irritant properties. ... Persons with pre-existing skin disorders may be more susceptible to the effects of this agent. ... Those with pre-existing eye problems may be at increased risk from exposure.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Emergency Medical Treatment:

Emergency Medical Treatment:

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The following Overview, ***** IRRITANTS *****, is relevant for this HSDB record chemical.

Life Support:

- o This overview assumes that basic life support measures have been instituted.

Clinical Effects:

SUMMARY OF EXPOSURE

0.2.1.1 ACUTE EXPOSURE

- o Whether a substance is labeled a "corrosive" or "irritant" depends on several factors: the nature of the substance, concentration, viscosity, pH, molarity, oxidation-reduction potential, complexing affinity toward bivalent ions etc. It is difficult to determine if a substance is a corrosive or irritant at a particular concentration.
 - o Irritants are substances that cause inflammation and swelling, but not cellular death and tissue damage. A corrosive would cause cellular damage and death.
1. Inhalation exposure may result in headache; nasal dryness and hemorrhage; and glottic, esophageal, or pulmonary edema.

HEENT

0.2.4.1 ACUTE EXPOSURE

- o Irritants may cause swelling, redness and pain at any site, especially at mucous membranes. The mouth, nose, and eyes are susceptible to these effects.

RESPIRATORY

0.2.6.1 ACUTE EXPOSURE

- o Cough, tachypnea, and wheezing are common after inhalation.

GASTROINTESTINAL

0.2.8.1 ACUTE EXPOSURE

- o Nausea, vomiting and diarrhea are possible if ingested.

DERMATOLOGIC

0.2.14.1 ACUTE EXPOSURE

- o Redness, swelling and pain may occur.

CARCINOGENICITY

0.2.21.2 HUMAN OVERVIEW

- o Development of sinonasal neoplasms has been associated with exposure to wood dust and other irritants.

Laboratory:

- o No specific laboratory tests are necessary with the possible exception of testing the pH of the irritant substance, and the pH of the ocular cul de sac with wide range pH paper.

Treatment Overview:

SUMMARY EXPOSURE

- o Life Support - Support respiratory and cardiovascular function.
- o Dilution and irrigation should be primary considerations. Systemic symptoms are unlikely.

ORAL EXPOSURE

- o EMESIS - Not indicated due to the irritant nature of these agents.
- o Charcoal and Cathartic - Are seldom recommended. They may promote vomiting and make endoscopic evaluation difficult.
- o DILUTION - Immediate therapy should be dilution with water in copious amounts. Do not exceed 15 mL/kg orally in a child (maximum 250 mL in a 16 kg or larger patient) as vomiting may occur with excessive fluids.
- o NEUTRALIZATION - Neutralization is not indicated.
- o Although these agents are irritants, and therefore should not produce tissue damage, it is almost impossible to assure that a particular substance under a particular set of circumstances would not cause damage.

Therefore, each patient should be examined with the idea that mucous membrane damage might have occurred.

INHALATION EXPOSURE

- o DECONTAMINATION: Move patient to fresh air. Monitor for respiratory distress. If cough or difficulty in breathing develops, evaluate for respiratory tract irritation, bronchitis, or pneumonitis. Administer 100 percent humidified supplemental oxygen with assisted ventilation as required.

EYE EXPOSURE

- o DECONTAMINATION: Exposed eyes should be irrigated with copious amounts of tepid water for at least 15 minutes. If irritation, pain, swelling, lacrimation, or photophobia persist, the patient should be seen in a health care facility.
- o If in a medical facility, sterile saline should be used to irrigate the eyes until the cul de sac is returned to neutrality. Some alkali exposures may require prolonged irrigation.

Range of Toxicity:

- o The extent of damage will depend on a number of factors including concentration, mechanism of action, pH, free acidity and alkalinity, molarity and oxidation-reduction potential. In most cases these factors are more important than volume. Besides its irritant effect, a substance may also have some type of systemic effect. Observe for any potential systemic effects, as is appropriate for each compound.

[Rumack BH: POISINDEX(R) Information System. Micromedex, Inc., Englewood, CO, 2001; CCIS Volume 107, edition exp February, 2001. Hall AH & Rumack BH (Eds):TOMES(R) Information System. Micromedex, Inc., Englewood, CO, 2001; CCIS Volume 107, edition exp February, 2001.] **PEER REVIEWED**

Animal Toxicity Studies:

Non-Human Toxicity Excerpts:

... EYE INJURY FROM THE FLUID /IS/ VERY SEVERE IN RABBIT FROM 0.005 ML UNDILUTED, SEVERE FROM 15% OR MORE IN GLYCOL & NOT SEVERE FROM 5% IN GLYCOL.

[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values, 4th ed., 1980. Cincinnati, Ohio: American Conference of Governmental Industrial Hygienists, Inc., 1980. 141]**PEER REVIEWED**

... REPEATED, DAILY INHALATION EXPOSURES OF RATS @ 500 PPM (+ OR -10%) REVEALED MARKED EYE & NASAL IRRITATION ON THE FIRST EXPOSURE DAY. MILD TREMORS OF THE HEAD & FORELEGS CONTINUED THROUGHOUT THE 5-DAY EXPOSURE PERIOD. CORNEAL OPACITY WAS OBSERVABLE IN A NUMBER OF THE RATS BY THE THIRD DAY, & BY THE FIFTH EXPOSURE 4 OF 20 ANIMALS HAD DIED. ALL ANIMALS LOST 40 TO 80 G. AUTOPSY SHOWED ACUTE PURULENT BRONCHITIS, AND BRONCHOPNEUMONIA BUT NO OTHER ORGAN INVOLVEMENT.

[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I,II, III. Cincinnati, OH: ACGIH, 1991. 462]**PEER REVIEWED**

... EXPOSURES @ 200 PPM (+ OR - 5%) RESULTED IN WEIGHT LOSS & EVENTUAL DEATH OF 7 OF THE 50 RATS EXPOSED BY ONE MONTH. BRONCHOPNEUMONIA WAS APPARENT CAUSE OF DEATH. AT THE END OF THREE MONTHS, APPARENT

ADAPTATION OCCURRED, AS NO CLINICAL VARIABLES THAT WERE MEASURED DIFFERED FROM THE CONTROLS; SIMILAR FINDINGS WERE MADE AT THE END OF SIX MONTHS. HISTOPATHOLOGIC EXAMINATION REVEALED THAT CONTROL AND EXPOSED ANIMAL TISSUES WERE NOT SIGNIFICANTLY DIFFERENT.

[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I,II, III. Cincinnati, OH: ACGIH, 1991. 462]**PEER REVIEWED**

DIETHYLAMINOETHANOL BLOCKED IMPULSE CONDUCTION IN FROG SCIATIC NERVES, BUT HAD NO LOCAL ANESTHETIC EFFECT ON RABBIT CORNEA.

[GUERRERO S ET AL; ARZNEIM- FORSCH; 23 (7): 951 (1973)]**PEER REVIEWED**

Diethylaminoethanol was evaluated for mutagenicity in the Salmonella/microsome preincubation assay using a standard protocol approved by the National Toxicology Program.

Diethylaminoethanol was tested at doses of 0, 33, 100, 333, 1000, 2500, and 3333 ug/plate in four Salmonella typhimurium strains (TA98, TA100, TA1535, and TA1537) in the presence and absence of Aroclor-induced rat or hamster liver S9. **Diethylaminoethanol** was negative in these tests and the highest ineffective dose level tested without total or slight clearing of the background lawn in any Salmonella tester strain was 1000 ug/plate.

[Zeiger E et al; Environ Mutagen 9: 1-110 (1987)]**PEER REVIEWED**

The liquid is a severe skin irritant; in the guinea pig it is a skin sensitizer.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS (NIOSH) Publication No. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Exposure of plants via treated steam containing 2-**diethylaminoethanol** has resulted in chlorosis in several plant species, including corn (*Zea mays*), tomato (*Lycopersicon esculentum*), bean (*Phaseolus vulgaris*), and Chrysanthemum (*Chrysanthemum morifolium*). Elevated (nontoxic) iron levels were also noted in the leaves of these plants.

[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 414]**PEER REVIEWED**

AS PRIMARY IRRITANT, IT CAN BE COMPARED TO MORPHOLINE, & ITS ACTION REGARDING EYE INJURY CAN BE COMPARED TO AMMONIUM HYDROXIDE.

[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I,II, III. Cincinnati, OH: ACGIH, 1991. 462]**PEER REVIEWED**

Inhalation toxicity (rats): Saturated vapor time for 0 deaths = 4 hr.

[Clayton, G. D. and F. E. Clayton (eds.). Patty's Industrial Hygiene and Toxicology: Volume 2A, 2B, 2C: Toxicology. 3rd ed. New York: John Wiley Sons, 1981-1982. 3147]**PEER REVIEWED**

Diethylethanolamine is a strongly alkaline liquid which has the same severity of injurious effect on rabbit eyes as ammonium hydroxide, judged at 24 hr.

[Grant, W.M. Toxicology of the Eye. 3rd ed. Springfield, IL: Charles C. Thomas Publisher, 1986. 337]**PEER REVIEWED**

Rats were administered 50 and 100 ppm 2-**diethylaminoethanol** orally for six months, with resulting weight loss and increased kidney/body weight ratios occurring in the 100 ppm group.

[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 413]**PEER REVIEWED**

In a 2 week study, male and female Fischer 344 rats were exposed to 0, 11, 56, and 301 ppm **diethylethanolamine** vapor for 6 hr/day, for 9 days. For the subchronic study, rats were exposed to

0, 11, 25, and 75 ppm **diethylethanolamine** vapor for 6 hr/day, 5 days/wk for up to 14 wk in inhalation chambers. Rats of both groups were studied for body weight changes, clinical symptoms, urinalysis, and blood analysis, and internal organs were examined logically. The nasal cavity and turbinates were examined for signs of toxicity. In the 2 wk study, the 301 ppm group was severely affected, and the high mortality rate limited the meaningful use of data. The principal histopathological findings from the 0, 10, and 56 ppm groups showed dose related changes of the nasal cavity and turbinates, with mononuclear inflammatory cell infiltrates and squamous metaplasia. In the subchronic study, signs of respiratory and ocular irritation appeared in the 76 ppm group during the second week, and similar symptoms appeared later in the 10 and 25 ppm groups. Corneal opacities, and metaplasia, hyperplasia and inflammatory cell infiltrations of the nasal mucosa, were noted. Hypertrophic goblet cells, focal necrosis, and exudate in the nasal lumen, were also evident. The lesions were still present at 4 wk postexposure. The 11 ppm and control rats were free of these lesions. /It was/ concluded that the no observed effect level for **diethylethanolamine** is 10 ppm. [Hinz JP et al; Fundam and Appl Toxicol 18 (3): 418-24 (1992)]**PEER REVIEWED**

Diethylaminoethanol, a neutralizing amine used to prevent corrosion of steam condensate lines, caused chlorosis in young leaves of chrysanthemum (*Chrysanthemum morifolium*), tomato (*Lycopersicon esculentum*), corn (*Zea mays*) and bean (*Phaseolus vulgaris*). Sensitivity of corn and chrysanthemum to **diethylaminoethanol** was cultivar-dependent; Indianapolis White chrysanthemum was sensitive to low concentrations of **diethylaminoethanol**, while Bonnie Jean, Velvet Ridge and Mistletoe were less so, and '3XD50' corn was sensitive to **diethylaminoethanol** while Ohio 28 was not. The presence of latent chrysanthemum chlorotic mottle viroid (ChCMV-L) increased the sensitivity of Bonnie Jean and Velvet Ridge to **diethylaminoethanol**. Infection of tomatoes with mild or severe strains of potato spindle tuber viroid (PSTV) resulted in increased sensitivity to **diethylaminoethanol** under conditions of environmental stress. Leaves of chrysanthemum exhibiting **diethylaminoethanol** induced chlorosis contained higher, but non-toxic, levels of iron and other minerals than those from non-**diethylaminoethanol** treated plants. [Horst RK et al; Sci Hortic 19 (1-2): 1-8 (1983)]**PEER REVIEWED**

Non-Human Toxicity Values:

LD50 Rabbit skin 1,260 mg/kg

[Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 1015]**PEER REVIEWED**

LD50 Guinea pig skin 1,000 mg/kg

[Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 1015]**PEER REVIEWED**

LD50 Rat oral 1,300 mg/kg

[Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 1015]**PEER REVIEWED**

LD50 Rat ip 1,220 mg/kg

[Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 1015]**PEER REVIEWED**

LD50 Mouse sc 1561 mg/kg

[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 413]**PEER REVIEWED**

LD50 Mouse ip 308 mg/kg

[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 413]**PEER REVIEWED**

LD50 Mouse im 416 mg/kg

[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 413]**PEER REVIEWED**

Ecotoxicity Values:

LC50 Pimephales promelas (fathead minnow) 1780 mg/l/96 hr (95% confidence limit 1660-1920 mg/l), flow-through bioassay with measured concentrations, 24.9 deg C, dissolved oxygen 6.5 mg/l, hardness 40.8 mg/l calcium carbonate, alkalinity 40.9 mg/l calcium carbonate, and pH 7.70
[Geiger D.L., Poirier S.H., Brooke L.T., Call D.J., eds. Acute Toxicities of Organic Chemicals to Fathead Minnows (Pimephales Promelas). Vol. III. Superior, Wisconsin: University of Wisconsin-Superior, 1986. 149]**PEER REVIEWED**

Metabolism/Pharmacokinetics:

Metabolism/Metabolites:

CHRONIC ORAL ADMIN ... TO RATS RESULTS IN LIVER ACCUM OF UP TO 60% OF THE DRUG. ... METABOLITES PRODUCED WERE **DIETHYLAMINOETHANOL N-OXIDE**, **DIETHYLAMINOACETIC ACID** & **ETHYLAMINOETHANOL** ...
[The Chemical Society. Foreign Compound Metabolism in Mammals Volume 3. London: The Chemical Society, 1975. 272]**PEER REVIEWED**

Absorption, Distribution & Excretion:

ORALLY ADMIN TO RATS, WAS MAINLY EXCRETED VIA KIDNEYS. ELIMINATED WITHIN FIRST 24 HR. AFTER 48 HR EXCRETED INDEPENDENTLY OF DOSE. AFTER 40 DAYS STILL BEING ELIMINATED. UP TO 60% ACCUMULATED IN LIVER. CNS & SPINAL CORD SHOWED HIGHEST CONCEN AFTER 7 DAYS.
[SCHULTE KE ET AL; ARZNEIM- FORSCH 22 (8): 1381 (1972)]**PEER REVIEWED**

The absorption of **2-diethylaminoethanol** (administered orally as **2-diethylaminoethanol acid malate** or 'Cerebrol') in healthy adult rats is very rapid, reaching a peak plasma level in 30 min. The biological half-life is 3.5 hr with 39% of the excreted product appearing in the urine after 48 hr.
[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 412]**PEER REVIEWED**

Biological Half-Life:

The biological half-life is 3.5 hr ...
[Snyder, R. (ed.). Ethyl Browning's Toxicity and Metabolism of Industrial Solvents. 2nd ed. Volume II: Nitrogen and Phosphorus Solvents. Amsterdam-New York-Oxford: Elsevier, 1990. 413]**PEER REVIEWED**

Pharmacology:

Environmental Fate & Exposure:

Environmental Standards & Regulations:

Chemical/Physical Properties:

Molecular Formula:

C6-H15-N-O
PEER REVIEWED

Molecular Weight:

117.19
[Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989. 491]**PEER REVIEWED**

Color/Form:

COLORLESS LIQUID
[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Colorless liquid.
[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 94-116. Washington, D.C.: U.S. Government Printing Office, June 1994. 106]**PEER REVIEWED**

Odor:

NAUSEATING ODOR
[American Conference of Governmental Industrial Hygienists, Inc. Documentation of the Threshold Limit Values and Biological Exposure Indices. 6th ed. Volumes I,II, III. Cincinnati, OH: ACGIH, 1991. 462]**PEER REVIEWED**

Nauseating, ammonia-like odor.
[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 94-116. Washington, D.C.: U.S. Government Printing Office, June 1994. 106]**PEER REVIEWED**

Boiling Point:

163 DEG C @ 760 MM HG
[Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991.,p. 3-238]**PEER REVIEWED**

Melting Point:

FREEZING POINT: -70 DEG C
[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Density/Specific Gravity:

0.8921 @ 20 DEG C/4 DEG C
[Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991.,p. 3-238]**PEER REVIEWED**

Dissociation Constants:

pKa = 9.87 @ 20 deg C
[Perrin DD; Dissociation constants of organic bases in aqueous solution. IUPAC Chem Data Ser, Butterworth, London (1965)]**PEER REVIEWED**

Heat of Vaporization:

383.9 kJ/kg

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

Solubilities:

SOL IN ALL PROPORTIONS IN WATER; SOL IN ALC, ETHER, ACETONE, BENZENE, PETROLEUM ETHER

[Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991., p. 3-238]**PEER REVIEWED**

Spectral Properties:

SADTLER REFERENCE NUMBER: 143 (IR, PRISM); INDEX OF REFRACTION: 1.4412 @ 20 DEG C/D

[Lide, DR (ed.). CRC Handbook of Chemistry and Physics. 71st ed. Boca Raton, FL: CRC Press Inc., 1990-1991., p. 3-238]**PEER REVIEWED**

IR: 6294 (Coblentz Society Spectral Collection)

[Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985., p. V1 611]**PEER REVIEWED**

NMR: 7047 (Sadler Research Laboratories Spectral Collection)

[Weast, R.C. and M.J. Astle. CRC Handbook of Data on Organic Compounds. Volumes I and II. Boca Raton, FL: CRC Press Inc. 1985., p. V1 611]**PEER REVIEWED**

Surface Tension:

29.2 mN/m at 20 deg C

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

Vapor Density:

4.03 (Air= 1)

[Sax, N.I. Dangerous Properties of Industrial Materials. 5th ed. New York: Van Nostrand Reinhold, 1979. 577]**PEER REVIEWED**

Vapor Pressure:

21 MM HG @ 20 DEG C

[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Viscosity:

5 mPa-s at 20 deg C

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

Other Chemical/Physical Properties:

HYGROSCOPIC LIQUID BASE COMBINING THE PROPERTIES OF AMINES & ALC;
WT/GAL: 7.14 LB @ 20 DEG C

[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Cubic expansion coefficient = 1.07×10^{-3} 1/K

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

Specific heat = 2.42 kJ/kg-K

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

Specific electrical conductivity = 1.1×10^{-3} 1/ohm-cm

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 8]**PEER REVIEWED**

vapor pressure = 1.4 mm Hg @ 25 deg C

[USEPA; Compilation and Speciation of National Emissions Factors For Consumer/ Commercial Use. Information Compiled to Support Urban air Toxics Assessment Studies; USEPA Off Air Radiat, Off Air Qual Plan Stand; Research Triangle Park, NC: EPA/450/2-89/008 PB89-207203 (1989A)]**PEER REVIEWED**

Chemical Safety & Handling:

DOT Emergency Guidelines:

Fire or explosion: Flammable/combustible materials. May be ignited by heat, sparks or flames. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Most vapors are heavier than air. They will spread along ground and collect in low or confined areas (sewers, basements, tanks). Vapor explosion hazard indoors, outdoors or in sewers. Some may polymerize (P) explosively when heated or involved in a fire. Runoff to sewer may create fire or explosion hazard. Containers may explode when heated. Many liquids are lighter than water.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of a Hazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of Hazardous Materials Initiatives and Training (DHM-50), Washington, D.C. (1996)., p. G-132]**PEER REVIEWED**

Health: May cause toxic effects if inhaled or ingested/swallowed. Contact with substance may cause severe burns to skin and eyes. Fire will produce irritating, corrosive and/or toxic gases. Vapors may cause dizziness or suffocation. Runoff from fire control or dilution water may cause pollution.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of a Hazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of Hazardous Materials Initiatives and Training (DHM-50), Washington, D.C. (1996)., p. G-132]**PEER REVIEWED**

Public safety: CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover. Isolate spill or leak area immediately for at least 50 to 100 meters (160 to 330 feet) in all directions. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of aHazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of HazardousMaterials Initiatives and Training (DHM-50), Washington, D.C. (1996).,p. G-132]**PEER REVIEWED**

Protective clothing: Wear positive pressure self-contained breathing apparatus (SCBA). Wear chemical protective clothing which is specifically recommended by the manufacturer. It may provide little or no thermal protection. Structural firefighters' protective clothing is recommended for fire situations only; it is not effective in spill situations.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of aHazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of HazardousMaterials Initiatives and Training (DHM-50), Washington, D.C. (1996).,p. G-132]**PEER REVIEWED**

Evacuation: Large spill: See the Table of Initial Isolation and Protective Action Distances for highlighted substances. For non-highlighted substances, increase, in the downwind direction, as necessary, the isolation distance shown under "PUBLIC SAFETY". Fire: If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of aHazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of HazardousMaterials Initiatives and Training (DHM-50), Washington, D.C. (1996).,p. G-132]**PEER REVIEWED**

Fire: Some of these materials may react violently with water. Small fires: Dry chemical, CO₂, water spray or alcohol-resistant foam. Large fires: Water spray, fog or alcohol-resistant foam. Move containers from fire area if you can do it without risk. Dike fire control water for later disposal; do not scatter the material. Do not get water inside containers. Fire involving tanks or car/trailer loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from the ends of tanks. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of aHazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of HazardousMaterials Initiatives and Training (DHM-50), Washington, D.C. (1996).,p. G-132]**PEER REVIEWED**

Spill or Leak: Fully encapsulating, vapor protective clothing should be worn for spills and leaks with no fire. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. Prevent entry into waterways, sewers, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Absorb with earth, sand or other non-combustible material and transfer to containers (except for Hydrazine). Use clean non-sparking tools to collect absorbed material. Large spills: Dike far ahead of liquid spill for later disposal. Water spray may reduce vapor; but may not prevent ignition in closed spaces.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of aHazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of HazardousMaterials Initiatives and Training (DHM-50), Washington, D.C. (1996).,p. G-132]**PEER REVIEWED**

First aid: Move victim to fresh air. Call emergency medical care. Apply artificial respiration if victim is not breathing. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Administer oxygen if breathing is difficult. Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. Keep victim warm and quiet. Effects of exposure (inhalation, ingestion or skin contact) to substance may be delayed. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

[U.S. Department of Transportation. 1996 North American Emergency Response Guidebook. A Guidebook for First Responders During the Initial Phase of a Hazardous Materials/Dangerous Goods Incident. U.S. Department of Transportation (U.S. DOT) Research and Special Programs Administration, Office of Hazardous Materials Initiatives and Training (DHM-50), Washington, D.C. (1996)., p. G-132] **PEER REVIEWED**

Odor Threshold:

Absolute perception limit in air = 0.011 ppm. 100% recognition in air = 0.04 ppm.

[U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.] **PEER REVIEWED**

Skin, Eye and Respiratory Irritations:

Diethylaminoethanol vapor is a skin, eye, and respiratory irritant.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS (NIOSH) Publication No. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.] **PEER REVIEWED**

Fire Potential:

Flammable; moderate fire hazard

[ITII. Toxic and Hazardous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1988. 174] **PEER REVIEWED**

NFPA Hazard Classification:

Health: 3. 3= Materials that, on short exposure, could cause serious temporary or residual injury, including those requiring protection from all bodily contact. Fire fighters may enter the area only if they are protected from all contact with the material. Full protective clothing, incl self-contained breathing apparatus, coat, pants, gloves, boots and bands around legs, arms and waist should be provided. No skin surface should be exposed.

[National Fire Protection Guide. Fire Protection Guide on Hazardous Materials. 10th ed. Quincy, MA: National Fire Protection Association, 1991., p. 325M-38] **PEER REVIEWED**

Flammability: 2. 2= Includes materials that must be moderately heated before ignition will occur and includes Class II and IIIA combustible liquids and solids and semi-solids that readily give off ignitable vapors. Water spray may be used to extinguish fires in these materials because the materials can be cooled below their flash points.

[National Fire Protection Guide. Fire Protection Guide on Hazardous Materials. 10th ed. Quincy, MA: National Fire Protection Association, 1991., p. 325M-38] **PEER REVIEWED**

Reactivity: 0. 0= Includes materials that are normally stable, even under fire exposure conditions, and that do not reactive with water. Normal fire fighting procedures may be used.

[National Fire Protection Guide. Fire Protection Guide on Hazardous Materials. 10th ed. Quincy, MA: National Fire Protection Association, 1991.,p. 325M-38]**PEER REVIEWED**

Flammable Limits:

Flammable limits in air, % by volume: Lower: 6.7; Upper: 11.7.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]**PEER REVIEWED**

Flash Point:

140 DEG F (OPEN CUP)

[ITII. Toxic and Hazardous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1988. 174]**PEER REVIEWED**

125 deg F (closed cup)

[U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.]**PEER REVIEWED**

Autoignition Temperature:

608 deg F (320 deg C)

[National Fire Protection Guide. Fire Protection Guide on Hazardous Materials. 10th ed. Quincy, MA: National Fire Protection Association, 1991.,p. 325M-38]**PEER REVIEWED**

Fire Fighting Procedures:

Wear goggles, self-contained breathing apparatus and rubber overclothing (including gloves).

[U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.]**PEER REVIEWED**

If material on fire or involved in fire: Do not extinguish fire unless flow can be stopped. Use water in flooding quantities as fog. Solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water. Apply water from as far a distance as possible. Use "alcohol" foam, carbon dioxide or dry chemical.

[Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, DC: Association of American Railroads, Bureau of Explosives, 1992. 350]**PEER REVIEWED**

Toxic Combustion Products:

Toxic gases and vapors (such as oxides of nitrogen and carbon monoxide) may be released in a fire involving diethylamino ethanol.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]**PEER REVIEWED**

Hazardous Reactivities & Incompatibilities:

Strong oxidizers, strong acids.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-

140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Hazardous Decomposition:

When heated to decomposition it emits toxic fumes of /nitrogen oxides/.

[Sax, N.I. Dangerous Properties of Industrial Materials. 6th ed. New York, NY: Van Nostrand Reinhold, 1984. 1015]**PEER REVIEWED**

Immediately Dangerous to Life or Health:

100 ppm

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Protective Equipment & Clothing:

Wear appropriate personal protective clothing to prevent skin contact.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Wear appropriate eye protection to prevent eye contact.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Eyewash fountains should be provided in areas where there is any possibility that workers could be exposed to the substance; this is irrespective of the recommendation involving the wearing of eye protection. /liquids containing > 5% of contaminant/

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Facilities for quickly drenching the body should be provided within the immediate work area for emergency use where there is a possibility of exposure. [Note: It is intended that these facilities provide a sufficient quantity or flow of water to quickly remove the substance from any body areas likely to be exposed. The actual determination of what constitutes an adequate quick drench facility depends on the specific circumstances. In certain instances, a deluge shower should be readily available, whereas in others, the availability of water from a sink or hose could be considered adequate.]

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Any supplied-air respirator. May require eye protection. Any self-contained breathing apparatus with a full facepiece. Recommendations for respirator selection. Max concn for use: 100 ppm. Respirator Class(es): Any chemical cartridge respirator with organic vapor cartridge(s). May require eye protection. Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister. Any powered, air-purifying respirator with organic vapor cartridge (s).

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Recommendations for respirator selection. Condition: Emergency or planned entry into unknown concn or IDLH conditions: Respirator Class(es): Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive pressure mode. Any supplied-air respirator with a full face piece and operated in pressure-demand or other positive pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Recommendations for respirator selection. Condition: Escape from suddenly occurring respiratory hazards: Respirator Class(es): Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Rubber gloves, all purpose canister respirator, overalls, face shield or goggles.

[U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.])**PEER REVIEWED**

Where exposure of an employee's body to liquid **diethylaminoethanol** may occur, facilities for quick drenching of the body should be provided within the immediate work area for emergency use.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS (NIOSH) Publication No. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.])**PEER REVIEWED**

Preventive Measures:

Contact lenses should not be worn when working with this chemical.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

SRP: The scientific literature for the use of contact lenses in industry is conflicting. The benefit or detrimental effects of wearing contact lenses depend not only upon the substance, but also on factors including the form of the substance, characteristics and duration of the exposure, the uses of other eye protection equipment, and the hygiene of the lenses. However, there may be individual substances whose irritating or corrosive properties are such that the wearing of contact lenses would be harmful to the eye. In those specific cases, contact lenses should not be worn. In any event, the usual eye protection equipment should be worn even when contact lenses are in place.

PEER REVIEWED

The worker should immediately wash the skin when it becomes contaminated.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Work clothing that becomes wet or significantly contaminated should be removed or replaced.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

If material not on fire and not involved in fire: Keep sparks, flames, and other sources of ignition away. Build dikes to contain flow as necessary. Use water spray to knock-down vapors.

[Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, DC: Association of American Railroads, Bureau of Explosives, 1992. 350]**PEER REVIEWED**

Personnel protection: Keep upwind. Avoid breathing vapors. Avoid bodily contact with the material. Do not handle broken packages unless wearing appropriate personal protective equipment. Wash away any material which may have contacted the body with copious amounts of water or soap and water. ... If contact with the material anticipated, wear appropriate chemical protective clothing.

[Association of American Railroads. Emergency Handling of Hazardous Materials in Surface Transportation. Washington, DC: Association of American Railroads, Bureau of Explosives, 1992. 350]**PEER REVIEWED**

Clothing contaminated with liquid **diethylaminoethanol** should be placed in closed containers for

storage until it can be discarded or until provision is made for the removal of **diethylaminoethanol** from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the **diethylaminoethanol**, the person performing the operation should be informed of **diethylaminoethanol's** hazardous properties.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]
PEER REVIEWED

Stability/Shelf Life:

Stability During Transport: Stable.

[U.S. Coast Guard, Department of Transportation. CHRIS - Hazardous Chemical Data. Volume II. Washington, D.C.: U.S. Government Printing Office, 1984-5.]**PEER REVIEWED**

Shipment Methods and Regulations:

No person may /transport,/ offer or accept a hazardous material for transportation in commerce unless that person is registered in conformance ... and the hazardous material is properly classed, described, packaged, marked, labeled, and in condition for shipment as required or authorized by ... /the hazardous materials regulations (49 CFR 171-177)./

[49 CFR 171.2 (7/1/96)]**PEER REVIEWED**

The International Air Transport Association (IATA) Dangerous Goods Regulations are published by the IATA Dangerous Goods Board pursuant to IATA Resolutions 618 and 619 and constitute a manual of industry carrier regulations to be followed by all IATA Member airlines when transporting hazardous materials.

[IATA. Dangerous Goods Regulations. 38th ed. Montreal, Canada and Geneva, Switzerland: International Air Transport Association, Dangerous Goods Board, January, 1997. 137]**PEER REVIEWED**

The International Maritime Dangerous Goods Code lays down basic principles for transporting hazardous chemicals. Detailed recommendations for individual substances and a number of recommendations for good practice are included in the classes dealing with such substances. A general index of technical names has also been compiled. This index should always be consulted when attempting to locate the appropriate procedures to be used when shipping any substance or article.

[IMDG; International Maritime Dangerous Goods Code; International Maritime Organization p.3131-1 (1988)]**PEER REVIEWED**

Cleanup Methods:

Overspread sufficient sodium bisulfate and sprinkle water. Drain into the sewer with abundant water. [ITII. Toxic and Hazardous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1988. 174]**PEER REVIEWED**

1. Remove all ignition sources. 2. Ventilate area of spill or leak. 3. For small quantities, absorb on paper towels. Evaporate in a safe place (such as a fume hood). Allow sufficient time for evaporating vapors to completely clear the hood ductwork. Burn the paper in a suitable location away from combustible materials. Large quantities can be reclaimed or collected and atomized in a suitable combustion chamber equipped with an appropriate effluent gas cleaning device.

Diethylaminoethanol should not be allowed to enter a confined space, such as a sewer, because of the possibility of an explosion. Sewers designed to preclude the formation of explosive concentrations of **diethylaminoethanol** vapors are permitted.

[Mackison, F. W., R. S. Stricoff, and L. J. Partridge, Jr. (eds.). NIOSH/OSHA - Occupational Health Guidelines for Chemical Hazards. DHHS(NIOSH) PublicationNo. 81-123 (3 VOLS). Washington, DC: U.S. Government Printing Office, Jan. 1981.]

PEER REVIEWED

Disposal Methods:

SRP: At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices.

PEER REVIEWED

Drain into the sewer with abundant water. (a) Dissolve in a combustible solvent such as alcohols, etc. Burn in an open furnace by igniting from a safe distance with the utmost care or sprinkle into the fire chamber of the furnace with afterburner and scrubber. (b) Pour into sodium bisulfate in a large evaporating dish. Sprinkle water and neutralize. Drain into the sewer with sufficient water.

[ITIII. Toxic and Hazardous Industrial Chemicals Safety Manual. Tokyo, Japan: The International Technical Information Institute, 1988. 174]**PEER REVIEWED**

Occupational Exposure Standards:

OSHA Standards:

Permissible Exposure Limit: Table Z-1 8-hr Time-Weighted Avg: 10 ppm (50 mg/cu m). Skin Designation.

[29 CFR 1910.1000 (7/1/98)]**QC REVIEWED**

Threshold Limit Values:

8 hr Time Weighted Avg (TWA) 2 ppm, skin

[American Conference of Governmental Industrial Hygienists. Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents Biological Exposure Indices for 1998. Cincinnati, OH: ACGIH, 1998. 32]**QC REVIEWED**

Excursion Limit Recommendation: Excursions in worker exposure levels may exceed three times the TLV-TWA for no more than a total of 30 min during a work day, and under no circumstances should they exceed five times the TLV-TWA, provided that the TLV-TWA is not exceeded.

[American Conference of Governmental Industrial Hygienists. Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents Biological Exposure Indices for 1998. Cincinnati, OH: ACGIH, 1998. 6]**QC REVIEWED**

NIOSH Recommendations:

Recommended Exposure Limit: 10 Hr Time-Weighted Avg: 10 ppm (50 mg/cu m), skin.

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Immediately Dangerous to Life or Health:

100 ppm

[NIOSH. NIOSH Pocket Guide to Chemical Hazards. DHHS (NIOSH) Publication No. 97-140. Washington, D.C. U.S. Government Printing Office, 1997. 106]**QC REVIEWED**

Manufacturing/Use Information:

Major Uses:

MFR OF EMULSIFYING AGENTS AND SPECIAL SOAPS

[Patty, F. (ed.). Industrial Hygiene and Toxicology: Volume II: Toxicology. 2nd ed. New York: Interscience Publishers, 1963. 2062]**PEER REVIEWED**

CHEM INT FOR PETROLEUM & GAS PROCESSING CHEMS, COSMETICS, SURFACE COATINGS, TEXTILES & FIBERS, PROCAINE, CHLOROQUINE
[SRI]**PEER REVIEWED**

WATER-SOL SALTS; FATTY ACID DERIVATIVES; TEXTILES SOFTNERS; PHARMACEUTICALS; ANTIRUST COMPOSITIONS; EMULSIFYING AGENTS IN ACID MEDIA; DERIVATIVES CONTAINING TERTIARY AMINE GROUPS; CURING AGENT FOR RESINS

[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Intermediate in production of pharmaceuticals, crop protection agents, and flocculants. Preparation of chemicals for the paper and leather industries; production of plastics.

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 9]**PEER REVIEWED**

Manufacturers:

Elf Atochem North America Inc, Hq, Three Parkway, Philadelphia, PA 19102 (215) 587-7000; Organic Chemicals Division; Production site: Riverview, MI 48192 (313) 285-9200
[SRI. 1994 Directory of Chemical Producers - United States of America. Menlo Park, CA: SRI International, 1994. 551]**PEER REVIEWED**

Pelron Corporation, 7847 West 47th St, PO Box 6, Lyons, IL 60534 (708) 442-9100
[SRI. 1994 Directory of Chemical Producers - United States of America. Menlo Park, CA: SRI International, 1994. 551]**PEER REVIEWED**

Union Carbide Corporation, Hq, Old Ridgebury Rd, Danbury, CT 06817 (203) 794-2000; Specialty Chemicals Division, Production site: South Charleston, WV 25303
[SRI. 1994 Directory of Chemical Producers - United States of America. Menlo Park, CA: SRI International, 1994. 551]**PEER REVIEWED**

Methods of Manufacturing:

... BY ACTION OF ETHYLENE CHLOROXYDRIN ON DIETHYLAMINE

[Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989. 491]**PEER REVIEWED**

... BY ACTION OF ETHYLENE OXIDE ON DIETHYLAMINE

[Budavari, S. (ed.). The Merck Index - Encyclopedia of Chemicals, Drugs and Biologicals. Rahway, NJ: Merck and Co., Inc., 1989. 491]**PEER REVIEWED**

Formulations/Preparations:

National Starch and Chemical Liquid Grade

[Kuney, J.H., J.M. Mullican (eds.). Chemyclopedia. Washington, DC: American Chemical Society, 1994. 68]**PEER REVIEWED**

GRADE: TECHNICAL

[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Specification: 99% min purity

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th

ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present.,p. VA10 9]**PEER REVIEWED**

Consumption Patterns:

Annual worldwide demand is more than 1,000 tons
 [Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed.Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present.,p. VA10 9]**PEER REVIEWED**

Laboratory Methods:

Clinical Laboratory Methods:

DIETHYLAMINOETHANOL WAS SEPARATED FROM HUMAN URINE BY PAPER ELECTROPHORESIS & THIN-LAYER CHROMATOGRAPHY, & ISOLATES WERE DETERMINED SPECTROPHOTOMETRICALLY.
 [VOICU A ET AL; FARMACIA (BUCHAREST) 18 (9): 539 (1970)]**PEER REVIEWED**

Analytic Laboratory Methods:

Method No. 200 Aminoethanol compounds. Gas chromatography (GC) working range: 5-300 mg/m³ in a 20-L air sample
 [U.S. Department of Health, Education Welfare, Public Health Service. Center for Disease Control, National Institute for Occupational Safety Health. NIOSH Manual of Analytical Methods. 2nd ed. Volumes 1-7. Washington, DC: U.S. Government Printing Office, 1977-present.]**PEER REVIEWED**

Special References:

Synonyms and Identifiers:

Synonyms:

DEAE
 PEER REVIEWED

DIAETHYLAMINOETHANOL (GERMAN)
 PEER REVIEWED

(DIETHYLAMINO)ETHANOL
 PEER REVIEWED

BETA-DIETHYLAMINOETHANOL
 PEER REVIEWED

N-DIETHYLAMINOETHANOL
 PEER REVIEWED

N,N-DIETHYL-2-AMINOETHANOL
 PEER REVIEWED

2-N-DIETHYLAMINOETHANOL
 PEER REVIEWED

2-DIETHYLAMINOETHANOL

****PEER REVIEWED****

BETA-DIETHYLAMINOETHYL ALCOHOL

****PEER REVIEWED****

2-(DIETHYLAMINO)ETHYL ALCOHOL

****PEER REVIEWED****

DIETHYLETHANOLAMINE

****PEER REVIEWED****

N,N-DIETHYLETHANOLAMINE

****PEER REVIEWED****

N,N-DIETHYL-N-(BETA-HYDROXYETHYL)AMINE

****PEER REVIEWED****

N,N-DIETHYL-2-HYDROXYETHYLAMINE

****PEER REVIEWED****

DIETHYL(2-HYDROXYETHYL)AMINE

****PEER REVIEWED****

DIETHYLMONOETHANOLAMINE

****PEER REVIEWED****

N,N-DIETHYLMONOETHANOLAMINE

****PEER REVIEWED****

ETHANOL, 2-(DIETHYLAMINO)-

****PEER REVIEWED****

(2-HYDROXYETHYL)DIETHYLAMINE

****PEER REVIEWED****

BETA-HYDROXYTRIETHYLAMINE

****PEER REVIEWED****

2-HYDROXYTRIETHYLAMINE

****PEER REVIEWED****

PENNAD 150

****PEER REVIEWED****

Formulations/Preparations:

National Starch and Chemical Liquid Grade

[Kuney, J.H., J.M. Mullican (eds.). Chemcyclopedia. Washington, DC: American Chemical Society, 1994. 68]**PEER REVIEWED**

GRADE: TECHNICAL

[Sax, N.I. and R.J. Lewis, Sr. (eds.). Hawley's Condensed Chemical Dictionary. 11th ed. New York: Van Nostrand Reinhold Co., 1987. 387]**PEER REVIEWED**

Specification: 99% min purity

[Gerhartz, W. (exec ed.). Ullmann's Encyclopedia of Industrial Chemistry. 5th ed. Vol A1: Deerfield Beach, FL: VCH Publishers, 1985 to Present., p. VA10 9]**PEER

REVIEWED**

Shipping Name/ Number DOT/UN/NA/IMO:

UN 2686; Diethylaminoethanol

IMO 3.3; Diethylaminoethanol

Standard Transportation Number:

49 131 86; Diethylaminoethanol

RTECS Number:

NIOSH/KK5075000

Administrative Information:

Hazardous Substances Databank Number: 329

Last Revision Date: 20000208

Last Review Date: Reviewed by SRP on 9/29/1994

Update History:

Complete Update on 02/08/2000, 1 field added/edited/deleted.
Complete Update on 11/18/1999, 1 field added/edited/deleted.
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Ethanol, 2-(diethylamino)-

- **Formula:** C₆H₁₅NO
- **Molecular Weight:** 117.19
- **CAS Registry Number:** 100-37-8
- **Chemical Structure:**



This structure is also available as a 2d Mol file.

- **Other Names:** N,N-Diethyl-2-aminoethanol; (Diethylamino)ethanol; DEAE; β-(Diethylamino)ethanol; Diethyl(2-hydroxyethyl)amine; N,N-Diethyl-N-(β-Hydroxyethyl)amine; N,N-Diethyl-2-hydroxyethylamine; N,N-Diethylethanolamine; N,N-Diethylmonoethanolamine; Pennad 150; 2-(Diethylamino)ethanol; 2-(Diethylamino)ethyl alcohol; 2-(N,N-Diethylamino)ethanol; 2-Hydroxytriethylamine; β-(Diethylamino)ethyl alcohol; (2-Hydroxyethyl)diethylamine; Diaethylaminoethanol; Diethylethanolamine; N-(Diethylamino)ethanol; 2-N-(Diethylamino)ethanol; UN 2686; Dehydasaal; Perdilatol; Loramine AMB 13
- Notes / Error Report
- **Other Data Available:**
 - Condensed phase thermochemistry data
 - Phase change data
 - Reaction thermochemistry data
 - Gas phase ion energetics data
 - Gas Phase IR Spectrum
 - Mass Spectrum
- Switch to calorie-based units


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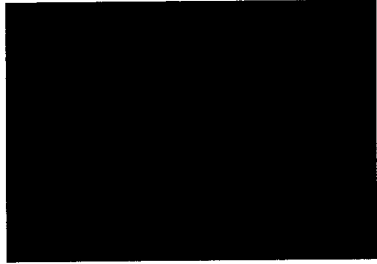
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Record #1		
		
CASE: 100-37-8		
Formula:	C6H15NO	
MW:	117.1906	
ACX Number:	X1002945-3	
ONLINE VENDORS	YOUR FAVORITES	OTHER VENDORS
ONLINE VENDORS:		
Acros - USA		
Alfa Aesar		
ICN		
Lancaster		
CATALOG VIEW		COMPACT VIEW

HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **DIETHYLAMINOETHANOL**

CAS Number: 100-37-8

DOT Number: UN2686

RTK Substance Number: 0691

Date: January 1986 Revision: September 1996

HAZARD SUMMARY

- * **Diethylaminoethanol** can affect you when breathed in and by passing through your skin.
- * **Diethylaminoethanol** can irritate the skin, causing a rash and burning feeling on contact.
- * Contact can cause severe irritation and burns of the eyes, leading to permanent damage.
- * Breathing **Diethylaminoethanol** can irritate the nose, throat and lungs, causing coughing and/or shortness of breath.
- * Exposure can cause nausea and vomiting.

IDENTIFICATION

Diethylaminoethanol is a colorless liquid with a weak ammonia-like odor. It is used in making medicines, pharmaceuticals, pesticides, and other chemicals.

REASON FOR CITATION

- * **Diethylaminoethanol** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH and NFPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

* **ODOR THRESHOLD=0.011 ppm.**

- * The range of accepted odor threshold values is quite broad. Cautions should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **10 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **10 ppm** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **2 ppm** averaged over an 8-hour workshift.

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Diethylaminoethanol**.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Diethylaminoethanol** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Diethylaminoethanol**:

- * **Diethylaminoethanol** can irritate the skin, causing a rash and burning feeling on contact.
- * Contact can cause severe irritation and burns of the eyes, leading to permanent damage.
- * Breathing **Diethylaminoethanol** can irritate the nose and throat, causing coughing, wheezing and/or shortness of breath.
- * Exposure can cause nausea and vomiting.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Diethylaminoethanol** and can last for months or years:

Cancer Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Diethylaminoethanol** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Diethylaminoethanol** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Diethylaminoethanol** can irritate the lungs.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following may be useful:

- * Lung function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically pump liquid **Diethylaminoethanol** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Diethylaminoethanol** should change into clean clothing promptly.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Diethylaminoethanol**.

- * Eye wash fountains should be provided in the immediate work area for emergency use for solutions containing 5 percent or more of **Diethylaminoethanol**.
- * Immediately wash any areas of the body that may have contacted **Diethylaminoethanol** and also wash or shower at the end of each workday, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Diethylaminoethanol** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Diethylaminoethanol**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposures over **2 ppm**, use a MSHA/NIOSH approved full facepiece respirator equipped with particulate (dust/fume/mist) filters. Even greater protection is provided by a powered-air purifying respirator. Particulate filters must be checked every day before work for physical damage, such as rips or tears, and replaced as needed.

- * If while wearing a filter, cartridge or canister respirator, you can smell, taste, or otherwise detect **Diethylaminoethanol**, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter, cartridge, or canister. If the seal is no longer good, you may need a new respirator.
- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters, cartridges, or canisters, to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposures exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode.
- * Exposure to **100 ppm** is immediately dangerous to life and health. If the possibility of exposure above **100 ppm** exists, use a MSHA/NIOSH approved self contained breathing apparatus with a full facepiece operated in continuous flow or other positive pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Diethylaminoethanol** you should be trained on its proper handling and storage.
- * **Diethylaminoethanol** must be stored to avoid contact with STRONG ACIDS (such as HYDROCHLORIC, SULFURIC and NITRIC), and STRONG OXIDIZERS (such as CHLORINE, BROMINE and FLUORINE), because violent reactions occur.
- * Store in tightly closed containers in a cool well-ventilated area away from HEAT.
- * Sources of ignition such as smoking and open flames are prohibited where **Diethylaminoethanol** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health and
Senior Services
Occupational Disease and Injury Services
Trenton, NJ 08625-0360
(609) 984-1863

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health and Senior Services physician who can help you find the services you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

Acarcinogen is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PEOSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

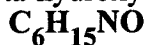
The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

**Can you guess your own age?****If you can, we need your help!** I am [CambridgeSoft](#)[ChemFinder.Com](#)[ChemStore.Com](#)[ChemNews.Com](#)[ChemClub.Com](#)[ChemQuote.Com](#)[ChemACX.Com](#)[SciStore.Com](#)[LabEquip.Com](#)[ChemSell.Com](#)

Enter a chemical name, CAS Number, molecular formula, or molecular weight

Or choose: [Substructure Query with Plug-In](#) or [Structure Query with Java](#)**ChemOffice 2001**

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ChemFinder for Word
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CombiChem**Diethylaminoethanol [100-37-8]****Synonyms:** 2-hydroxytriethylamine; diethyl(2-hydroxyethyl)amine; 2-Diethylaminoethanol; Diethylethanolamine; DEAE; N,N-Diethyl-2-hydroxyethylamine; N,N-Diethylethanolamine; N,N-Diethylaminoethanol; n-diethylaminoethanol; beta-diethylaminoethanol; 2-N,N-diethylaminoethanol; N,N-diethyl-N-(beta-hydroxyethyl)amine; beta-hydroxytriethylamine;

117.1906

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ACX Number	X1002945-3	CAS RN	100-37-8
Melting Point (°C)	-70	Density	0.884
Boiling Point (°C)	162	Vapor Density	
Refractive Index		Vapor Pressure	
Evaporation Rate		Water Solubility	miscible.
Flash Point (°C)	60	EPA Code	
DOT Number	UN 2686 Flammable Liquid	RTECS	KK5075000
Comments	Colorless liquid with a weak, ammonia odor. HYGROSCOPIC.		

More information about the chemical is available in these categories:[Chemical Online Order](#)[Health](#)[Misc](#)[MSDS](#)[Physical Properties](#)[Regulations](#)[Structures](#)

Chemical Online Order[Available Chemicals Exchange](#)[Information about this particular compound](#)**Health**[ATSDR Internet HazDat Site Contaminant Query](#)[Information about this particular compound](#)[NTP Chemical Health and Safety Data](#)[Information about this particular compound](#)[Hazardous Chemicals Database at the University of Akron](#)[Information about this particular compound](#)[8\(e\) TRIAGE Chemical Studies Database](#)[Low Molecular Weight Chemicals causing Occupational Asthma](#)[International Chemical Safety Cards](#)[Information about this particular compound](#)[Idaho Toxic and Hazardous Substances](#)[North American Emergency Response Guidebook 1996 \(NAERG96\)](#)[Information about this particular compound](#)[Australian Atmospheric Exposure Standards](#)[Information about this particular compound](#)[Australian Hazardous Substances Database](#)[Information about this particular compound](#)[Information about this particular compound](#)[Information about this particular compound](#)**Misc**[Chemical management](#)[Information about this particular compound](#)**MSDS**[New Jersey Right to Know Hazardous Substance Fact Sheets](#)[Information about this particular compound](#)**Physical Properties**[NIST Chemistry WebBook](#)[Information about this particular compound](#)[ABCR GmbH&Co KG](#)[2-Diethylaminoethanol, 99%](#)[Proton NMR Spectral Molecular Formula Index](#)[Information about this particular compound](#)[DuPont TYVEK® Protective Apparel Information Service](#)[Information about this particular compound](#)[Galactic Industries Corporation Spectral Database](#)[FTIR SPECTRUM of ETHANOL, 2-/DIETHYLAMINO/-,](#)

FTIR SPECTRUM of ETHANOL, 2-/DIETHYLAMINO/-,Genium's Chemical Container Label DatabaseInformation about this particular compoundNFPA Chemical Hazard LabelsInformation about this particular compoundInformation about this particular compound**Regulations**NASA Department of Environmental Services List Of Lists of Regulated ChemicalsInformation about this particular compoundCalifornia EPA List of ListsOSHA Chemical Sampling and MethodsInformation about this particular compoundOSHA Limits for Air ContaminantsChemical Weapons ConventionGuide to NIOSH/OSHA Air Sampling MethodsInformation about this particular compoundInformation about this particular compound**Structures**CyberMol collection of molecules in VRML formatInformation about this particular compound

Enter a chemical name, CAS Number, molecular formula, or molecular weight

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Click on **Sort** to change the order of the retrieved References.*

- | Select Record | Reference |
|----------------------------|--|
| 1 <input type="checkbox"/> | <u>NEG and NIOSH Basis for an Occupational Health Standard. 2-Diethylaminoethanol</u>
Toren K
Arbete och Hals, No. 25, 22 pages, 45 references, 1994 [NIOSH] |
| 2 <input type="checkbox"/> | <u>The Polycation Diethylaminoethyl Dextran Potentiates Thermal Cell Killing</u>
Modlinski M ; Calderwood SK ; Stevenson MA ; Hahn GM
International Journal of Radiation Biology, Vol. 46, No. 5, pages 587-596, 29 references, 19841984 [NIOSH] |
| 3 <input type="checkbox"/> | <u>Evidence of a lack of enteric side-effects induced by DEAE-dextran in man.</u>
Zuccato E ; Mussini E ; Spignoli G ; Pupita F
Pharmacol Res Commun; VOL 19, ISS 8, 1987, P547-53 [TOXBIB] |
| 4 <input type="checkbox"/> | <u>An assay for the detection of specific binding of 3-methylcholanthrene to rat liver cytosolic proteins using DEAE-cellulose.</u>
Tierney B ; Munzer S ; Bresnick E
Anal Biochem; VOL 133, ISS 1, 1983, P40-5 [TOXBIB] |
| 5 <input type="checkbox"/> | <u>Health Hazard Evaluation Report No. HETA-83-020-1351, Johnson Museum, Cornell University, Ithaca, New York</u>
Fannick N ; Lipscomb J ; McManus K
Hazard Evaluations and Technical Assistance Branch, NIOSH, Cincinnati, Ohio, Report No. HETA-83-020-1351, 11 pages, 7 references, 19831983 [NIOSH] |
| 6 <input type="checkbox"/> | <u>Partial Composition of a Low Molecular Weight Cotton Bract Extract Which Induces Airway Constriction in Humans</u>
Buck MG ; Schachter EN ; Wall JH
Proceedings, Sixth Cotton Dust Research Conference, Beltwide Cotton Production Research Conferences, Las Vegas, Nevada, January 4, 1982, P. J. Wakelyn, Editor; Memphis, Tennessee, National Cotton Council of America, pages 19-23, 15 references, 19821982 [NIOSH] |
| 7 <input type="checkbox"/> | <u>NEG and NIOSH Basis for an Occupational Health Standard: 2-Diethylaminoethanol.</u>
Toren K
Govt Reports Announcements & Index (GRA&I), Issue 22, 1996 [NTIS] |
| 8 <input type="checkbox"/> | <u>Effect of adjuvants on antibody responses of sheep immunised with recombinant pili from Dichelobacter nodosus.</u>
Walduck AK ; Opdebeeck JP
Aust Vet J; VOL 74, ISS 6, 1996, P451-5 [TOXBIB] |
| 9 <input type="checkbox"/> | <u>Study on the partial purification of gonadotropins and thyrotropin from deer (Cervus elaphus) pituitaries.</u> |

- (Cervus elaphus) pituitaries.**
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- 10 **Consensus report for 2-Diethylaminoethanol (DEAE)**
 Criteria group for occupational standards
 TA:Arbete och Hälsa PG:38-43 YR:1995 IP: VI:19 [RISKLINE]
- 11 **NEG and NIOSH Basis for an Occupational Health Standard. 2-Diethylaminoethanol**
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- 16 **Bovine respiratory syncytial virus infection of bovine embryonic lung cultures: enhancement of infectivity with diethylaminoethyl-dextran and virus-infected cells.**
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- 17 **Assessment of the Health Risks of Morpholine and Diethylaminoethanol.**
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- 18 **Factors influencing transient expression in cytotoxic T cells following DEAE dextran-mediated gene transfer.**
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- 19 **Clinical pharmacology of DEAE-dextran for long-term administration (one year).**
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 Int J Clin Pharmacol Res; VOL 3, ISS 4, 1983, P287-93 [TOXBIB]
- 20 **Preparation Of Ion-Exchange Silica And Effect Of pH On Protein Binding Of Ion-Exchange Silica**
 Roy AK ; Burgum A ; Roy S
 Journal of Chromatographic Science, Vol. 22, No. 2, pages 84-86, 10 references,
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 [NIOSH]

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CombiChem**Diethylaminoethanol [100-37-8]****Synonyms:** 2-hydroxytriethylamine; diethyl(2-hydroxyethyl)amine; 2-Diethylaminoethanol; Diethylethanolamine; DEAE; N,N-Diethyl-2-hydroxyethylamine; N,N-Diethylethanolamine; N,N-Diethylaminoethanol; n-diethylaminoethanol; beta-diethylaminoethanol; 2-N,N-diethylaminoethanol; N,N-diethyl-N-(beta-hydroxyethyl)amine; beta-hydroxytriethylamine; $C_6H_{15}NO$
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ACX Number	X1002945-3	CAS RN	100-37-8
Melting Point (°C)	-70	Density	0.884
Boiling Point (°C)	162	Vapor Density	
Refractive Index		Vapor Pressure	
Evaporation Rate		Water Solubility	miscible.
Flash Point (°C)	60	EPA Code	
DOT Number	UN 2686 Flammable Liquid	RTECS	KK5075000
Comments	Colorless liquid with a weak, ammonia odor. HYGROSCOPIC.		

More information about the chemical is available in these categories:[Chemical Online Order](#)
[Physical Properties](#)[Health](#)
[Regulations](#)[Misc](#)
[Structures](#)[MSDS](#)

Chemical Online Order

Available Chemicals Exchange

Information about this particular compound

Health

ATSDR Internet HazDat Site Contaminant Query

Information about this particular compound

NTP Chemical Health and Safety Data

Information about this particular compound

Hazardous Chemicals Database at the University of Akron

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8(e) TRIAGE Chemical Studies Database

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Idaho Toxic and Hazardous Substances

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Australian Atmospheric Exposure Standards

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Misc

Chemical management

Information about this particular compound

MSDS

New Jersey Right to Know Hazardous Substance Fact Sheets

Information about this particular compound

Physical Properties

NIST Chemistry WebBook

Information about this particular compound

ABCR GmbH&Co KG

2-Diethylaminoethanol, 99%

Proton NMR Spectral Molecular Formula Index

Information about this particular compound

DuPont TYVEK® Protective Apparel Information Service

Information about this particular compound

Galactic Industries Corporation Spectral Database

FTIR SPECTRUM of ETHANOL, 2-/DIETHYLAMINO/-,

FTIR SPECTRUM of ETHANOL, 2-/DIETHYLAMINO/-,[Genium's Chemical Container Label Database](#)[Information about this particular compound](#)[NFPA Chemical Hazard Labels](#)[Information about this particular compound](#)[Information about this particular compound](#)**Regulations**[NASA Department of Environmental Services List Of Lists of Regulated Chemicals](#)[Information about this particular compound](#)[California EPA List of Lists](#)[OSHA Chemical Sampling and Methods](#)[Information about this particular compound](#)[OSHA Limits for Air Contaminants](#)[Chemical Weapons Convention](#)[Guide to NIOSH/OSHA Air Sampling Methods](#)[Information about this particular compound](#)[Information about this particular compound](#)**Structures**[CyberMol collection of molecules in VRML format](#)[Information about this particular compound](#)

Enter a chemical name, CAS Number, molecular formula, or molecular weight

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HAZARDOUS SUBSTANCE FACT SHEET

Common Name: **DIETHYLAMINOETHANOL**

CAS Number: 100-37-8

DOT Number: UN2686

RTK Substance Number: 0691

Date: January 1986 Revision: September 1996

HAZARD SUMMARY

- * **Diethylaminoethanol** can affect you when breathed in and by passing through your skin.
- * **Diethylaminoethanol** can irritate the skin, causing a rash and burning feeling on contact.
- * Contact can cause severe irritation and burns of the eyes, leading to permanent damage.
- * Breathing **Diethylaminoethanol** can irritate the nose, throat and lungs, causing coughing and/or shortness of breath.
- * Exposure can cause nausea and vomiting.

IDENTIFICATION

Diethylaminoethanol is a colorless liquid with a weak ammonia-like odor. It is used in making medicines, pharmaceuticals, pesticides, and other chemicals.

REASON FOR CITATION

- * **Diethylaminoethanol** is on the Hazardous Substance List because it is regulated by OSHA and cited by ACGIH, DOT, NIOSH and NFPA.
- * Definitions are provided on page 5.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED

The New Jersey Right to Know Act requires most employers to label chemicals in the workplace and requires public employers to provide their employees with information and training concerning chemical hazards and controls. The federal OSHA Hazard Communication Standard, 1910.1200, requires private employers to provide similar training and information to their employees.

- * Exposure to hazardous substances should be routinely evaluated. This may include collecting air samples. Under OSHA 1910.20, you have a legal right to obtain copies of sampling results from your employer.
- * If you think you are experiencing any work-related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

* **ODOR THRESHOLD=0.011 ppm.**

- * The range of accepted odor threshold values is quite broad. Caution should be used in relying on odor alone as a warning of potentially hazardous exposures.

WORKPLACE EXPOSURE LIMITS

OSHA: The legal airborne permissible exposure limit (PEL) is **10 ppm** averaged over an 8-hour workshift.

NIOSH: The recommended airborne exposure limit is **10 ppm** averaged over a 10-hour workshift.

ACGIH: The recommended airborne exposure limit is **2 ppm** averaged over an 8-hour workshift.

- * The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.

WAYS OF REDUCING EXPOSURE

- * Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
- * Wear protective work clothing.
- * Wash thoroughly immediately after exposure to **Diethylaminoethanol**.
- * Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of **Diethylaminoethanol** to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects

The following acute (short-term) health effects may occur immediately or shortly after exposure to **Diethylaminoethanol**:

- * **Diethylaminoethanol** can irritate the skin, causing a rash and burning feeling on contact.
- * Contact can cause severe irritation and burns of the eyes, leading to permanent damage.
- * Breathing **Diethylaminoethanol** can irritate the nose and throat, causing coughing, wheezing and/or shortness of breath.
- * Exposure can cause nausea and vomiting.

Chronic Health Effects

The following chronic (long-term) health effects can occur at some time after exposure to **Diethylaminoethanol** and can last for months or years:

Cancer Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Diethylaminoethanol** has not been tested for its ability to cause cancer in animals.

Reproductive Hazard

- * According to the information presently available to the New Jersey Department of Health and Senior Services, **Diethylaminoethanol** has not been tested for its ability to affect reproduction.

Other Long-Term Effects

- * **Diethylaminoethanol** can irritate the lungs.

MEDICAL

Medical Testing

If symptoms develop or overexposure is suspected, the following may be useful:

- * Lung function tests.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures

Because smoking can cause heart disease, as well as lung cancer, emphysema, and other respiratory problems, it may worsen respiratory conditions caused by chemical exposure. Even if you have smoked for a long time, stopping now will reduce your risk of developing health problems.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, **ENGINEERING CONTROLS** are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

In evaluating the controls present in your workplace, consider: (1) how hazardous the substance is, (2) how much of the substance is released into the workplace and (3) whether harmful skin or eye contact could occur. Special controls should be in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following control is recommended:

- * Where possible, automatically pump liquid **Diethylaminoethanol** from drums or other storage containers to process containers.

Good **WORK PRACTICES** can help to reduce hazardous exposures. The following work practices are recommended:

- * Workers whose clothing has been contaminated by **Diethylaminoethanol** should change into clean clothing promptly.
- * Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to **Diethylaminoethanol**.

- * Eye wash fountains should be provided in the immediate work area for emergency use for solutions containing 5 percent or more of **Diethylaminoethanol**.
- * Immediately wash any areas of the body that may have contacted **Diethylaminoethanol** and also wash or shower at the end of each workday, whether or not known skin contact has occurred.
- * Do not eat, smoke, or drink where **Diethylaminoethanol** is handled, processed, or stored, since the chemical can be swallowed. Wash hands carefully before eating or smoking.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing

- * Avoid skin contact with **Diethylaminoethanol**. Wear protective gloves and clothing. Safety equipment suppliers/manufacturers can provide recommendations on the most protective glove/clothing material for your operation.
- * All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.

Eye Protection

- * Wear splash-proof chemical goggles and face shield when working with liquid, unless full facepiece respiratory protection is worn.

Respiratory Protection

IMPROPER USE OF RESPIRATORS IS DANGEROUS.

Such equipment should only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

- * Where the potential exists for exposures over **2 ppm**, use a MSHA/NIOSH approved full facepiece respirator equipped with particulate (dust/fume/mist) filters. Even greater protection is provided by a powered-air purifying respirator. Particulate filters must be checked every day before work for physical damage, such as rips or tears, and replaced as needed.

- * If while wearing a filter, cartridge or canister respirator, you can smell, taste, or otherwise detect **Diethylaminoethanol**, or in the case of a full facepiece respirator you experience eye irritation, leave the area immediately. Check to make sure the respirator-to-face seal is still good. If it is, replace the filter, cartridge, or canister. If the seal is no longer good, you may need a new respirator.
- * Be sure to consider all potential exposures in your workplace. You may need a combination of filters, prefilters, cartridges, or canisters, to protect against different forms of a chemical (such as vapor and mist) or against a mixture of chemicals.
- * Where the potential for high exposures exists, use a MSHA/NIOSH approved supplied-air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode.
- * Exposure to **100 ppm** is immediately dangerous to life and health. If the possibility of exposure above **100 ppm** exists, use a MSHA/NIOSH approved self contained breathing apparatus with a full facepiece operated in continuous flow or other positive pressure mode.

HANDLING AND STORAGE

- * Prior to working with **Diethylaminoethanol** you should be trained on its proper handling and storage.
- * **Diethylaminoethanol** must be stored to avoid contact with **STRONG ACIDS** (such as **HYDROCHLORIC**, **SULFURIC** and **NITRIC**), and **STRONG OXIDIZERS** (such as **CHLORINE**, **BROMINE** and **FLUORINE**), because violent reactions occur.
- * Store in tightly closed containers in a cool well-ventilated area away from **HEAT**.
- * Sources of ignition such as smoking and open flames are prohibited where **Diethylaminoethanol** is used, handled, or stored in a manner that could create a potential fire or explosion hazard.

QUESTIONS AND ANSWERS

- Q: If I have acute health effects, will I later get chronic health effects?
- A: Not always. Most chronic (long-term) effects result from repeated exposures to a chemical.
- Q: Can I get long-term effects without ever having short-term effects?
- A: Yes, because long-term effects can occur from repeated exposures to a chemical at levels not high enough to make you immediately sick.

- Q: What are my chances of getting sick when I have been exposed to chemicals?
- A: The likelihood of becoming sick from chemicals is increased as the amount of exposure increases. This is determined by the length of time and the amount of material to which someone is exposed.
- Q: When are higher exposures more likely?
- A: Conditions which increase risk of exposure include physical and mechanical processes (heating, pouring, spraying, spills and evaporation from large surface areas such as open containers), and "confined space" exposures (working inside vats, reactors, boilers, small rooms, etc.).
- Q: Is the risk of getting sick higher for workers than for community residents?
- A: Yes. Exposures in the community, except possibly in cases of fires or spills, are usually much lower than those found in the workplace. However, people in the community may be exposed to contaminated water as well as to chemicals in the air over long periods. Because of this, and because of exposure of children or people who are already ill, community exposures may cause health problems.

The following information is available from:

New Jersey Department of Health and
Senior Services
Occupational Disease and Injury Services
Trenton, NJ 08625-0360
(609) 984-1863

Industrial Hygiene Information

Industrial hygienists are available to answer your questions regarding the control of chemical exposures using exhaust ventilation, special work practices, good housekeeping, good hygiene practices, and personal protective equipment including respirators. In addition, they can help to interpret the results of industrial hygiene survey data.

Medical Evaluation

If you think you are becoming sick because of exposure to chemicals at your workplace, you may call a Department of Health and Senior Services physician who can help you find the services you need.

Public Presentations

Presentations and educational programs on occupational health or the Right to Know Act can be organized for labor unions, trade associations and other groups.

Right to Know Information Resources

The Right to Know Infoline (609) 984-2202 can answer questions about the identity and potential health effects of chemicals, list of educational materials in occupational health, references used to prepare the Fact Sheets, preparation of the Right to Know survey, education and training programs, labeling requirements, and general information regarding the Right to Know Act. Violations of the law should be reported to (609) 984-2202.

DEFINITIONS

ACGIH is the American Conference of Governmental Industrial Hygienists. It recommends upper limits (called TLVs) for exposure to workplace chemicals.

Acarcinogen is a substance that causes cancer.

The **CAS number** is assigned by the Chemical Abstracts Service to identify a specific chemical.

A **combustible** substance is a solid, liquid or gas that will burn.

A **corrosive** substance is a gas, liquid or solid that causes irreversible damage to human tissue or containers.

DEP is the New Jersey Department of Environmental Protection.

DOT is the Department of Transportation, the federal agency that regulates the transportation of chemicals.

EPA is the Environmental Protection Agency, the federal agency responsible for regulating environmental hazards.

A **fetus** is an unborn human or animal.

A **flammable** substance is a solid, liquid, vapor or gas that will ignite easily and burn rapidly.

The **flash point** is the temperature at which a liquid or solid gives off vapor that can form a flammable mixture with air.

HHAG is the Human Health Assessment Group of the federal EPA.

IARC is the International Agency for Research on Cancer, a scientific group that classifies chemicals according to their cancer-causing potential.

A **miscible** substance is a liquid or gas that will evenly dissolve in another.

mg/m³ means milligrams of a chemical in a cubic meter of air. It is a measure of concentration (weight/volume).

MSHA is the Mine Safety and Health Administration, the federal agency that regulates mining. It also evaluates and approves respirators.

A **mutagen** is a substance that causes mutations. A **mutation** is a change in the genetic material in a body cell. Mutations can lead to birth defects, miscarriages, or cancer.

NAERG is the North American Emergency Response Guidebook. It was jointly developed by Transport Canada, the United States Department of Transportation and the Secretariat of Communications and Transportation of Mexico. It is a guide for first responders to quickly identify the specific or generic hazards of material involved in a transportation incident, and to protect themselves and the general public during the initial response phase of the incident.

NCI is the National Cancer Institute, a federal agency that determines the cancer-causing potential of chemicals.

NFPA is the National Fire Protection Association. It classifies substances according to their fire and explosion hazard.

NIOSH is the National Institute for Occupational Safety and Health. It tests equipment, evaluates and approves respirators, conducts studies of workplace hazards, and proposes standards to OSHA.

NTP is the National Toxicology Program which tests chemicals and reviews evidence for cancer.

OSHA is the Occupational Safety and Health Administration, which adopts and enforces health and safety standards.

PE OSHA is the Public Employees Occupational Safety and Health Act, a state law which sets PELs for New Jersey public employees.

ppm means parts of a substance per million parts of air. It is a measure of concentration by volume in air.

A **reactive** substance is a solid, liquid or gas that releases energy under certain conditions.

A **teratogen** is a substance that causes birth defects by damaging the fetus.

TLV is the Threshold Limit Value, the workplace exposure limit recommended by ACGIH.

The **vapor pressure** is a measure of how readily a liquid or a solid mixes with air at its surface. A higher vapor pressure indicates a higher concentration of the substance in air and therefore increases the likelihood of breathing it in.

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Ethanol, 2-(diethylamino)-

- **Formula:** C₆H₁₅NO
- **Molecular Weight:** 117.19
- **CAS Registry Number:** 100-37-8
- **Chemical Structure:**



This structure is also available as a 2d Mol file.

- **Other Names:** N,N-Diethyl-2-aminoethanol; (Diethylamino)ethanol; DEAE; β-(Diethylamino)ethanol; Diethyl(2-hydroxyethyl)amine; N,N-Diethyl-N-(β-Hydroxyethyl)amine; N,N-Diethyl-2-hydroxyethylamine; N,N-Diethylethanolamine; N,N-Diethylmonoethanolamine; Pennad 150; 2-(Diethylamino)ethanol; 2-(Diethylamino)ethyl alcohol; 2-(N,N-Diethylamino)ethanol; 2-Hydroxytriethylamine; β-(Diethylamino)ethyl alcohol; (2-Hydroxyethyl)diethylamine; Diaethylaminoethanol; Diethylethanolamine; N-(Diethylamino)ethanol; 2-N-(Diethylamino)ethanol; UN 2686; Dehydasaal; Perdilatol; Loramine AMB 13
- Notes / Error Report
- **Other Data Available:**
 - Condensed phase thermochemistry data
 - Phase change data
 - Reaction thermochemistry data
 - Gas phase ion energetics data
 - Gas Phase IR Spectrum
 - Mass Spectrum
- Switch to calorie-based units


Notes / Error Report

Go To: Top

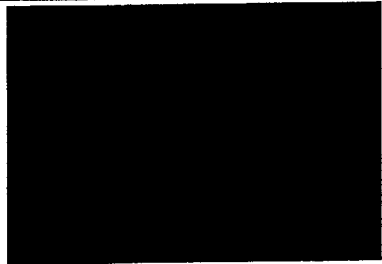
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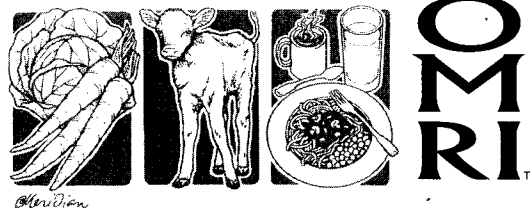
- If you believe that this page may contain an error, please fill out the error report form for this page.

	Standard Reference Data Program	Online Databases	Chemistry WebBook
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NAMES ▾ TABLE VIEW MARK ■		
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CAS#: 100-37-8		
Formula:	C6H15NO	
MW:	117.1906	
ACX Number:	X1002945-3	
ONLINE VENDORS	YOUR FAVORITES	OTHER VENDORS
ONLINE VENDORS:		
Acros - USA		
Alfa Aesar		
ICN		
Lancaster		
CATALOG VIEW		COMPACT VIEW

March 26, 2001
Food and Drug Administration
Freedom of Information Staff (HFI-35)
5600 Fishers Lane
Rockville, MD 20857



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Albuquerque, NM

Affiliations listed for identification

Dear FDA FOIA Staff:

The Organic Materials Review Institute (OMRI) requests, pursuant to the Freedom of Information Act (FOIA), 5 USC 552, information on the following substance that is approved for use by FDA as boiler water additives:

<u>Substance</u>	<u>CAS #</u>	<u>21 CFR</u>	<u>Federal Register Notice</u>	<u>Date</u>
Diethylaminoethanol	100-37-8	173.310(d)33	FR 6654	May 1, 1968

The appropriate *Federal Register* notice is attached for your convenience.

Please provide any data or information used by FDA to issue regulations regarding the safe use of the boiler compound listed above when used in the preparation of steam that contacts food. In particular, please provide the basis for the determination of the limitation found in 21 CFR 173.310(d). OMRI specifically requests any data submitted by the petitioners regarding the amount of this chemical found in steam and food. OMRI also requests data submitted by those who may have objected to the original notice, and any data submitted subsequent to the establishment of the regulation regarding the use of this compound as a boiler water additives.

Also, please provide any information on verification of compliance with the limitations set forth in that section. This would include test methods employed by FDA, the sampling procedure, the results from the analysis of the samples taken, and any actions taken against violators from 1968 to the most recent date for which information is available. Please provide any record of investigation and reports of measures taken by companies found out of compliance or in violation of these limitations, including any product recalls related to this compound.

OMRI respectfully requests that any and all fees for this request be waived because it meets both tests of FDA's FOIA Implementation Policy for Waivers contained in 21 CFR 20.43:

(1) *Is in the public interest because it is likely to contribute significantly to public understanding of the operations or activities of the Government*

OMRI is tendering this request as part of research under contract for the US Department of Agriculture's National Organic Program as the Technical

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SMUCKER QUALITY BEVERAGES
SPEEDWAY AVE
CHICO
(530)899-5000

CA 95928

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NATIONAL ORGANIC STANDARDS BOARD
USDA/AMS/TM/NOP ROOM 2510-S0
AG STOP 0268, P. O. BOX 96456
WASHINGTON DC 20090-6456

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REF: 01.11.003.000.1730.000.0000

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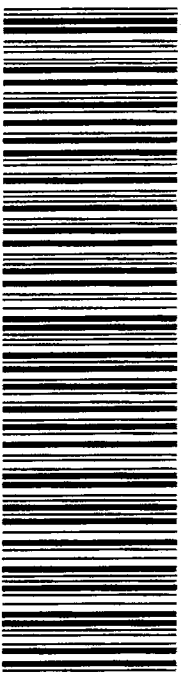
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TRK# 4224 9008 9775 Form 0201

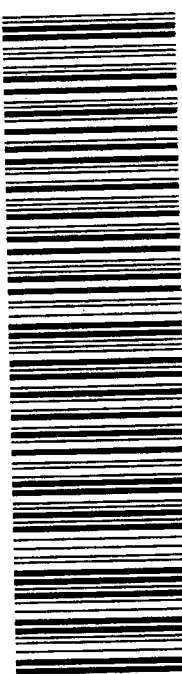
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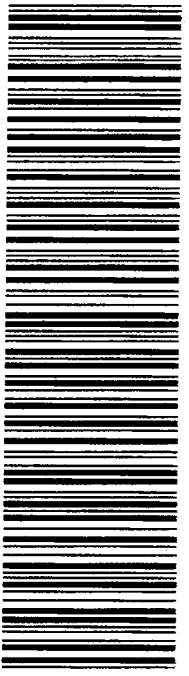
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