

# Standard Operating Procedure

## DIETHANOLAMINE

*This SOP is not complete until it has been signed and dated by the PI and relevant lab personnel.*

Print a copy and insert into your  
*Laboratory Safety Manual and Chemical Hygiene Plan.*  
Refer to instructions for assistance.

Department:	Chemistry & Biochemistry – Chemical Engineering
Date SOP was written:	December 10, 2012
Date SOP was approved by PI/lab supervisor:	January 18, 2013
Principal Investigator:	Prof. Susannah Scott
Internal Lab Safety Coordinator/Lab Manager:	Stephanie Goubert-Renaudin
Lab Phone:	805-893-8941
Office Phone:	805-893-7403
Emergency Contact:	EH&S 24 hour line: 805-893-3194
Locations covered by this SOP	ESB 3324 and 3328.

**Type of SOP:**    ☐ Process            ☒ Hazardous Chemical            ☐ Hazardous Class

### Purpose

Diethanolamine is a viscous liquid widely used as a chemical intermediate and as a corrosion inhibitor and surface-active agent in various products including metal-working fluids, oils, fuels, paints, inks, cosmetic formulations and agricultural products. Occupational exposure may occur by inhalation and dermal contact. The general population may be exposed through contact with a variety of personal care products.

### Physical & Chemical Properties/Definition of Chemical Group

CAS#	111-42-2
Class:	<b><u>Irritant, Carcinogen</u></b>
Molecular Formula:	C <sub>4</sub> H <sub>11</sub> NO <sub>2</sub>
Form (Physical State):	Colorless, viscous liquid with a mild ammonia odor above room temperature or solid crystals at room temperature
Melting Point:	28 °C (82 °F)

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Flash Point: 138°C (280 °F)- closed cup

## Potential Hazards/Toxicity

Pictogram



## Potential Health Effects

**Inhalation** May be harmful if inhaled. May cause respiratory tract irritation.

**Skin** May be harmful if absorbed through skin. May cause skin irritation.

**Eyes** May cause eye irritation.

**Ingestion** May be harmful if swallowed.

## Personal Protective Equipment (PPE)

### Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

### Hand Protection

Handle with gloves. [Butyl, Nitrile, Neoprene, Polyvinyl chloride, Viton and Barrier gloves are recommended.](#) Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

- Avoid skin contact with **Diethanolamine**. Wear personal protective equipment made from material that cannot be permeated or degraded by this substance. Safety equipment suppliers and manufacturers can provide recommendations on the most protective glove and clothing material for your operation

### Eye protection

Tightly fitting safety goggles.

### Skin and body protection

Complete suit protection against chemicals. Long pants, closed-toed and closed-heeled shoes, cotton-based clothing/attire, and flame resistant lab coat must be worn for protecting against chemical hazards.

### Hygiene measures

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

## Engineering Controls

All operations involving diethanolamine must be carried out in a certified chemical fume hood or a glove box.

## First Aid Procedures

*Notify supervisor and EH&S immediately.*

### If inhaled

Move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

### In case of skin contact

Take off contaminated clothing immediately. Wash off with soap and plenty of water for 15 minutes. Take victim immediately to hospital. Consult a physician.

### In case of eye contact

Rinse thoroughly with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid immediately. Continue to wash eyes during transport to the hospital.

### If swallowed

Do not induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

## Special Handling and Storage Requirements

### Precautions for safe handling

- Avoid contact with skin and eyes. Avoid inhalation of vapor or mist

### Conditions for safe storage

- Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
- Air sensitive

### Chemical stability

Absorbs carbon dioxide from air. Stable under recommended storage conditions

### Conditions to avoid

No data available

### Materials to avoid

Oxidizing agents, copper, zinc, iron

### Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NO<sub>x</sub>)

Hazardous decomposition products formed under fire conditions- Nature of decomposition unknown.

## Spill and Accident Procedure

### Fire-fighting & Extinguishing media

#### Suitable extinguishing media

Use water spray, alcohol resistant foam, dry chemical or carbon dioxide.

#### Special protective equipment for fire-fighters

Wear Self-Contained Breathing Apparatus (SCBA) for fire-fighting if necessary.

#### Personal precautions

- Avoid breathing vapors, mist or gas.
- Ensure adequate ventilation.
- Evacuate personnel to safe areas.

#### Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

#### Methods and materials for containment and cleaning up

- Soak up with inert absorbent material and dispose of as hazardous waste.
- Keep in suitable, tightly closed containers for disposal.

### Chemical Spill Dial **9-911** and EH&S (805-893-3194)

**Spill** – Assess the extent of danger. Help contaminated or injured persons. Evacuate the spill area. Avoid breathing vapors. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

**Small (<1 L)** – If you have training, you may assist in the clean-up effort. Use appropriate personal protective equipment and clean-up material for chemical spilled. Double bag spill waste in clear plastic bags, label and take to the next chemical waste pick-up.

**Large (>1 L)** – Dial **9-911** from campus phones (and 805-893-3446 from a cell phone) and EH&S (805-893-3194) for assistance.

**Chemical Spill on Body or Clothes** – Remove clothing and rinse body thoroughly in emergency shower for at least 15 minutes. Seek medical attention. *Notify supervisor and EH&S immediately.*

**Chemical Splash Into Eyes** – Immediately rinse eyeball and inner surface of eyelid with water from the emergency eyewash station for 15 minutes by forcibly holding the eye open. Seek medical attention. *Notify supervisor and EH&S immediately.*

### Medical Emergency Dial **9-911**

**Life Threatening Emergency, After Hours, Weekends and Holidays** – Dial **9-911** (or 805-893-3446 from a cell phone) or go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All Serious injuries must be reported to EH&S within 8 hours.*

**Non-Life Threatening Emergency** – Go to the Student Health Building, Building 588 (phone number: 893-5361, hours: M, T, R, F 8am-4.30pm, W 9am - 4.30pm, R 5pm to 7pm by appointment). After hours go to the Emergency Room of Goleta Valley Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411) *Note: All serious injuries must be reported to EH&S within 8 hours.*

**Needle stick/puncture exposure** (as applicable to chemical handling procedure) – Wash the affected area with antiseptic soap and warm water for 15 minutes. For mucous membrane exposure, flush the affected area for 15 minutes using an eyewash station. Page the needle stick nurse \ and then enter your extension. After hours go to the nearest emergency room: the Emergency Room of Goleta Valley

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Cottage Hospital at 351 South Patterson Avenue, Goleta (Phone number: 805-967-3411). Note: All needle stick/puncture exposures must be reported to EH&S within 8 hours.

## Decontamination/Waste Disposal Procedure

**NOTE:** Specific information on decontamination/waste disposal is to be added to the Protocol/Procedure section.

*General hazardous waste disposal guidelines:*

### Label Waste

- Affix an on-line hazardous waste tag on all waste containers using the UCSB Hazardous Waste Program as soon as the first drop of waste is added to the container.

### Store Waste

- Store hazardous waste in closed containers, in secondary containment and in a designated location
- Store dry waste in glass jar
- Waste must be under the control of the person generating & disposing of it

### Dispose of Waste

- Dispose of regularly generated chemical waste within 6 months
- Call EH&S for questions
- Empty Containers
  - Dispose as hazardous waste if it once held extremely hazardous waste (irrespective of the container size)
  - Consult waste pick-up schedule

Prepare for transport to pick-up location

- Check on-line waste tag
- Write date of pick-up on the waste tag
- Use secondary containment

## Material Safety Data Sheet (MSDS) Location

MSDS can be accessed online at:

<http://www.sigmaaldrich.com/catalog/product/sial/d8885?lang=de&region=DE>

## Protocol/Procedure

In the laboratory, diethanolamine is used as a reagent in organic synthesis.

As it is listed as a toxic and corrosive chemical, diethanolamine is stored in a ventilated cabinet and is kept away from strong oxidizing agents.

Safety goggles, butyl, nitrile, neoprene, polyvinyl chloride, Viton or Barrier gloves and labcoat must be worn at all times during handling.

Diethanolamine should be handled inside a ventilated fume hood or inside the glove-box.

Any waste contaminated with diethanolamine should be properly disposed of inside the appropriate waste container, kept closed at all times.

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**NOTE: Any deviation from this SOP requires approval from PI.**

**Documentation of Training** (*signature of all users is required*)

- Prior to conducting any work with diethanolamine, designated personnel, i.e. approved users listed above, must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the Sodium Hydride MSDS provided by the manufacturer.
- The Principal Investigator must ensure that his/her laboratory personnel have attended appropriate laboratory safety training or refresher training as required by EH&S.

I have read and understand the content of this SOP:

Name	Signature	Trainer	Date
<b>Prof. Susannah Scott</b>			
Stephanie Goubert-Renaudin			
Gary Kwanyi Ng			
Alessandro Gallo			
Anthony Crisci			
Haibo Yu			
Taeho Hwang			
Bethany Wigington			
Daniel Coller			
Zachary Jones			
Youhong Wang			
Jinghong Zhou			

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