



SAFETY DATA SHEET

1. Identification

Product identifier	Diethanolamine
Other means of identification	
Catalog number	1192808
CAS number	111-42-2
Synonyms	Bis(2-hydroxyethyl)amine
Chemical name	2,2'-Iminodiethanol
Recommended use	Specified quality tests and assay use only.
Recommended restrictions	Not for use as a drug. Not for administration to humans or animals.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name	U. S. Pharmacopeia	
Address	12601 Twinbrook Parkway	
	Rockville	
	MD	
	20852-1790	
	United States	
Telephone	RS Technical Services	301-816-8129
Website	www.usp.org	
E-mail	RSTECH@usp.org	
Emergency phone number	CHEMTREC within US & Canada	1-800-424-9300
	CHEMTREC outside US & Canada	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 1
	Carcinogenicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2 (blood, liver, kidney)
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	

Label elements



Signal word	Danger
Hazard statement	Harmful if swallowed. Causes skin irritation. Causes serious eye damage. Suspected of causing cancer. May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure.
Precautionary statement	
Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection.

Response	If swallowed: Call a poison center/doctor if you feel unwell. Rinse mouth. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a poison center/doctor. If on skin: Wash with plenty of water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. If exposed or concerned: Get medical advice/attention. Get medical advice/attention if you feel unwell.
Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	None.

3. Composition/information on ingredients

Substance

Chemical name	Common name and synonyms	CAS number	%
Diethanolamine	Bis(2-hydroxyethyl)amine	111-42-2	100

4. First-aid measures

Inhalation	If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a physician if symptoms develop or persist.
Skin contact	Rinse skin with water/shower. Take off contaminated clothing and wash before reuse. If skin irritation or rash occurs: Get medical advice/attention.
Eye contact	Call a physician or poison control center immediately. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Ingestion	Rinse mouth. If ingestion of a large amount does occur, call a poison control center immediately. Do not induce vomiting without advice from poison control center. If vomiting occurs, keep head low so that stomach content doesn't get into the lungs.
Most important symptoms/effects, acute and delayed	Serious eye damage.
Indication of immediate medical attention and special treatment needed	Provide general supportive measures and treat symptomatically.
General information	Remove from exposure. Remove contaminated clothing. For treatment advice, seek guidance from an occupational health physician or other licensed health-care provider familiar with workplace chemical exposures. In the United States, the national poison control center phone number is 1-800-222-1222. If person is not breathing, give artificial respiration. If breathing is difficult, give oxygen if available. Persons developing serious hypersensitivity (anaphylactic) reactions must receive immediate medical attention.

5. Fire-fighting measures

Suitable extinguishing media	Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).
Unsuitable extinguishing media	Do not use water jet as an extinguisher, as this will spread the fire.
Specific hazards arising from the chemical	No unusual fire or explosion hazards noted.
Special protective equipment and precautions for firefighters	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.
Fire fighting equipment/instructions	Move containers from fire area if you can do so without risk.
Specific methods	Use standard firefighting procedures and consider the hazards of other involved materials.
General fire hazards	No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Wear appropriate personal protective equipment. Avoid inhalation of vapors. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. For personal protection, see section 8 of the SDS.
Methods and materials for containment and cleaning up	Absorb spillage with suitable absorbent material. Clean surface thoroughly to remove residual contamination. For waste disposal, see section 13 of the SDS.

Environmental precautions

Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage**Precautions for safe handling**

As a general rule, when handling USP Reference Standards, avoid all contact and inhalation of dust, mists, and/or vapors associated with the material. Clean equipment and work surfaces with suitable detergent or solvent after use. After removing gloves, wash hands and other exposed skin thoroughly. Select and use containment devices and personal protective equipment based on a risk assessment of material potency and exposure potential.

Conditions for safe storage, including any incompatibilities

Store in tight container as defined in the USP-NF. This material should be handled and stored per label instructions to ensure product integrity.

8. Exposure controls/personal protection**Occupational exposure limits**

The following constituents are the only constituents of the product which have a PEL, TLV or other recommended exposure limit. At this time, the other constituents have no known exposure limits.

US. ACGIH Threshold Limit Values

Material	Type	Value	Form
Diethanolamine (CAS 111-42-2)	TWA	1 mg/m ³	Inhalable fraction and vapor.

US. NIOSH: Pocket Guide to Chemical Hazards

Material	Type	Value
Diethanolamine (CAS 111-42-2)	TWA	15 mg/m ³ 3 ppm

Exposure limit values**Industrial Use**

Material	Type	Value
Diethanolamine (CAS 111-42-2)	TWA	2 mg/m ³

Biological limit values

No biological exposure limits noted for the ingredient(s).

Exposure guidelines**US - California OELs: Skin designation**

Diethanolamine (CAS 111-42-2) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Diethanolamine (CAS 111-42-2) Can be absorbed through the skin.

Appropriate engineering controls

For laboratory operations, use good technique and limit open handling. Control exposures to below the occupational exposure level (if available). Select and use containment devices and personal protective equipment based on a risk assessment of exposure potential. Cover all containers for solutions and slurries while being transferred.

Individual protection measures, such as personal protective equipment**Eyeface protection**

Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face. An emergency eye wash station should be available.

Skin protection**Hand protection**

Wear nitrile or other impervious gloves if skin contact is possible. When the material is dissolved or suspended in an organic solvent, wear gloves that provide protection against the solvent.

Other

Wear lab coat. Base the choice of skin protection on the job activity, potential for skin contact and solvents and reagents in use. Do not wear protective garments in common areas (e.g., cafeterias) or out-of-doors.

Respiratory protection

Respirators are generally not required for laboratory operations. Choose respiratory protection appropriate to the task and the level of existing engineering controls.

Thermal hazards

Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations

Handling practices in this SDS are recommendations for laboratory use of reference standards. Procedures for any other uses or quantities should be determined after an appropriate assessment.

9. Physical and chemical properties**Appearance**

Appearance descriptions are general information and not specific to any USP lot.

Physical state	Liquid.
Form	Liquid. May solidify.
Color	Colorless. Clear.
Odor	Ammoniacal odor.
Odor threshold	Not available.
pH	11 Solution: 0.1 N
Melting point/freezing point	82.4 °F (28 °C) / 80.6 - 82.4 °F (27 - 28 °C)
Initial boiling point and boiling range	514.4 - 518 °F (268 - 270 °C)
Flash point	280.4 °F (138.0 °C)
Evaporation rate	Not available.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	Not available.
Vapor density	3.65
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Miscible.
Solubility (other)	Acetone: Miscible. Chloroform: Miscible. Ethanol: Miscible. Glycerol: Miscible.
Partition coefficient (n-octanol/water)	-1.43
Auto-ignition temperature	1223.6 °F (662 °C)
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Chemical family	Secondary amine.
Density	1.10 g/cm ³ (at 25 °C)
Molecular formula	C ₄ H ₁₁ NO ₂
Molecular weight	105.14 g/mol
Specific gravity	1.1 (at 25 °C)

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	No dangerous reaction known under conditions of normal use.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong acids. Strong oxidizing agents. Acid anhydrides. Halides.
Hazardous decomposition products	NO _x . Irritating and/or toxic fumes or gases. Emits toxic fumes under fire conditions.

11. Toxicological information

Information on likely routes of exposure

Inhalation	Knowledge about health hazard is incomplete.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye damage.
Ingestion	Harmful if swallowed.

Symptoms related to the physical, chemical and toxicological characteristics Blindness. Tearing. Red, scaly skin.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Product	Species	Test Results
Diethanolamine (CAS 111-42-2)		
Acute		
Dermal		
LD50	Rabbit	8100 - 12200 mg/kg
Oral		
LD50	Rat	770 - 3500 mg/kg
		710 mg/kg

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye damage.

Local effects

Eye irritation test, undiluted.
Result: Severe irritation.
Species: Rabbit
Skin irritation test, undiluted.
Result: Mild irritation
Species: Rabbit

Respiratory or skin sensitization

Respiratory sensitization Knowledge about sensitization hazard is incomplete.

Skin sensitization Based on available data, the classification criteria are not met.

Guinea pig maximization test
Result: Negative.

Germ cell mutagenicity Knowledge about mutagenicity is incomplete.

Mutagenicity

Cell transformation in Syrian hamster cells
Result: Mixed results.
Chromosomal aberrations in Chinese hamster ovary cells in vitro
Result: Negative.
D. melanogaster study
Result: Aneuploidy induced.
Gene mutation in mouse lymphoma cells
Result: Negative.
In vivo mouse micronucleus assay
Result: Negative.
Reverse mutation in S. typhimurium and E. coli
Result: Negative.
Sister chromatid exchange in Chinese hamster ovary cells in vitro
Result: Negative.

Carcinogenicity Suspected of causing cancer.

0 - 160 mg/kg/day Carcinogenicity study, administered dermally.
Result: Increased incidence of liver and kidney tumors
Species: Mouse
Test Duration: 103 weeks
0 - 64 mg/kg/day Carcinogenicity study, administered dermally.
Result: No treatment- related increase in the incidence of tumors.
Species: Rat
Test Duration: 103 weeks

IARC Monographs. Overall Evaluation of Carcinogenicity

Diethanolamine (CAS 111-42-2) 2B Possibly carcinogenic to humans.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

US. National Toxicology Program (NTP) Report on Carcinogens

Not listed.

Reproductive toxicity Based on available data, the classification criteria are not met.

Reproductivity

0 - 1500 mg/kg Reproductivity and development study, administered dermally during gestation.

Result: No evidence of teratogenicity.

Species: Rat

0 - 202 mg/m3 Reproductivity and development study, administered via inhalation during gestation.

Result: NOAEL for maternal and fetal toxicity = 50 mg/m3, for teratogenicity = 200 mg/m3

Species: Rat

0 - 350 mg/kg Reproductivity and development study, administered dermally during gestation.

Result: No developmental toxicity noted.

Species: Rabbit

450 mg/kg/day Reproductivity study, administered orally during gestation.

Result: No maternal toxicity; no adverse effects on litter size or pup birth weights.

Species: Mouse

Specific target organ toxicity - single exposure Knowledge about health hazard is incomplete.

Specific target organ toxicity - repeated exposure May cause damage to organs (blood, liver, kidney) through prolonged or repeated exposure.

Toxicity studies in rats and mice, administered in drinking water; 15 to 440 mg/kg/day (rat), 100 to 1700 mg/kg/day (mouse)

Result: Toxic effects in both species at multiple organ sites, including liver, kidney, and bone marrow.

Test Duration: 13 weeks

Aspiration hazard Based on available data, the classification criteria are not met.

12. Ecological information

Ecotoxicity

Product	Species	Test Results
Diethanolamine (CAS 111-42-2)		
Aquatic		
Fish	LC50	Fathead minnow (Pimephales promelas) > 100 mg/l, 96 hours
Acute		
Crustacea	LC50	Daphnia magna 55 mg/l, 48 hours (Freshwater; static)

Persistence and degradability No data is available on the degradability of this substance.

Bioaccumulative potential

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. Under RCRA, it is the responsibility of the user of the product to determine, at the time of disposal, whether the product meets RCRA criteria for hazardous waste.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

Waste from residues / unused products Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging

Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information**DOT**

Not regulated as dangerous goods.

IATA

Not regulated as dangerous goods.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not established.

General information It is the shipper's responsibility to determine the correct transport classification at the time of shipment.

15. Regulatory information

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

Toxic Substances Control Act (TSCA)**TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)**

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Diethanolamine (CAS 111-42-2) Listed.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed.

Superfund Amendments and Reauthorization Act of 1986 (SARA)**SARA 302 Extremely hazardous substance**

Not listed.

SARA 311/312 Hazardous chemical Yes

Classified hazard categories Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Carcinogenicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Diethanolamine	111-42-2	100

Other federal regulations**Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List**

Diethanolamine (CAS 111-42-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations**California Proposition 65**

WARNING: This product can expose you to Diethanolamine, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Proposition 65 - CRT: Listed date/Carcinogenic substance

Diethanolamine (CAS 111-42-2) Listed: June 22, 2012

US. California. Candidate Chemicals List. Safer Consumer Products Regulations (Cal. Code Regs, tit. 22, 69502.3, subd. (a))

Diethanolamine (CAS 111-42-2)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	Yes
Canada	Domestic Substances List (DSL)	Yes
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	Yes
Taiwan	Taiwan Chemical Substance Inventory (TCSI)	Yes
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)

A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date	01-10-2005
Revision date	08-13-2020
Version #	04
Disclaimer	USP Reference Standards are sold for chemical test and assay purposes only, and NOT for human consumption. The information contained herein is applicable solely to the chemical substance when used as a USP Reference Standard and does not necessarily relate to any other use of the substance described, (i.e. at different concentrations, in drug dosage forms, or in bulk quantities). USP Reference Standards are intended for use by persons having technical skill and at their own discretion and risk. This information has been developed by USP staff from sources considered reliable but has not been independently verified by the USP. Therefore, the USP Convention cannot guarantee the accuracy of the information in these sources nor should the statements contained herein be considered an official expression. NO REPRESENTATION OR WARRANTY, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE is made with respect to the information contained herein.