

## Diethanolamine

Version number: 1.0

### SECTION 1: Identification

#### 1.1 Product identifier

Identification of the substance	2,2'-Iminodiethanol
Trade name	<b><u>Diethanolamine</u></b>
CAS number	111-42-2

#### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses	Chemicals for various applications
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#### 1.3 Details of the supplier of the safety data sheet

Valudor Products, LLC 179 Calle Magdalena Suite 100 Encinitas, California CA 92024 United States	Telephone: +1 (760) 635 8500 e-mail: info@valudor.com Website: www.valudor.com
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#### 1.4 Emergency telephone number

Emergency information	800-535-5053 (Infotrac)
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As above or nearest toxicological information centre.

### SECTION 2: Hazard(s) identification

#### 2.1 Classification of the substance or mixture

Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Classification				
Section	Hazard class	Category	Hazard class and category	Hazard statement
A.10	acute toxicity (oral)	4	Acute Tox. 4	H302
A.2	skin corrosion/irritation	2	Skin Irrit. 2	H315
A.3	serious eye damage/eye irritation	1	Eye Dam. 1	H318
A.6	carcinogenicity	2	Carc. 2	H351
A.9	specific target organ toxicity - repeated exposure	2	STOT RE 2	H373

For full text of abbreviations: see SECTION 16

#### The most important adverse physicochemical, human health and environmental effects

Delayed or immediate effects can be expected after short or long-term exposure.

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## 2.2 Label elements

Labelling acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

Signal word danger

Pictograms

GHS05, GHS07, GHS08



Hazard statements

- H302** Harmful if swallowed.
- H315** Causes skin irritation.
- H318** Causes serious eye damage.
- H351** Suspected of causing cancer.
- H373** May cause damage to organs (liver, blood, kidney, nervous system) through prolonged or repeated exposure.

Precautionary statements

- P201** Obtain special instructions before use.
- P202** Do not handle until all safety precautions have been read and understood.
- P260** Do not breathe dust/fume/gas/mist/vapors/spray.
- P264** Wash thoroughly after handling.
- P270** Do not eat, drink or smoke when using this product.
- P280** Wear protective gloves/protective clothing/eye protection/face protection.
- P302+P352** If on skin: Wash with plenty of water.
- P305+P351+P338** If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
- P308+P313** If exposed or concerned: Get medical advice/attention.
- P310** Immediately call a poison center/doctor.
- P330** Rinse mouth.
- P362** Take off contaminated clothing and wash before reuse.
- P405** Store locked up.
- P501** Dispose of contents/container to an authorized waste treatment facility.

## 2.3 Other hazards

Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

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## SECTION 3: Composition/information on ingredients

### 3.1 Substances

<b>Name of substance</b>	2,2'-Iminodiethanol
<b>Identifiers</b>	
CAS No	111-42-2
<b>Molecular formula</b>	C <sub>4</sub> H <sub>11</sub> NO <sub>2</sub>
<b>Molar mass</b>	105.1 g/mol

## SECTION 4: First-aid measures

### 4.1 Description of first-aid measures

#### General notes

Take off immediately all contaminated clothing.

Symptoms may develop several hours following exposure; medical observation therefore necessary for at least 48 hours.

In all cases of doubt, or when symptoms persist, seek medical advice.

#### Following inhalation

Provide fresh air.

Mouth to mouth resuscitation should be avoided. Use alternative methods, preferably with oxygen or compressed air driven apparatus.

If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.

#### Following skin contact

After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water.

If skin irritation occurs: Get medical advice/attention.

#### Following eye contact

Rinse immediately carefully and thoroughly with eye shower or water.

Remove contact lenses, if present and easy to do. Continue rinsing.

Get immediate medical advice/attention.

#### Following ingestion

Rinse mouth immediately and drink plenty of water.

Do NOT induce vomiting.

Call a physician immediately.

#### Notes for the doctor

None.

### 4.2 Most important symptoms and effects, both acute and delayed

This information is not available.

### 4.3 Indication of any immediate medical attention and special treatment needed

None.

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## SECTION 5: Fire-fighting measures

### 5.1 Extinguishing media

#### Suitable extinguishing media

water, alcohol resistant foam, fire extinguishing powder, carbon dioxide (CO<sub>2</sub>)

#### Unsuitable extinguishing media

water jet

### 5.2 Special hazards arising from the substance or mixture

Combustible.

Hazardous decomposition products: Section 10.

Deposited combustible dust has considerable explosion potential.

#### Hazardous combustion products

nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>)

### 5.3 Advice for firefighters

Keep containers cool with water spray.

In case of fire and/or explosion do not breathe fumes.

Coordinate firefighting measures to the fire surroundings.

Do not allow firefighting water to enter drains or water courses.

Collect contaminated firefighting water separately.

Fight fire with normal precautions from a reasonable distance.

#### Special protective equipment for firefighters

chemical protection suit, wear self-contained breathing apparatus

## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

#### For non-emergency personnel

Remove persons to safety.

Ventilate affected area.

Special danger of slipping by leaking/spilling product.

Eliminate all ignition sources if safe to do so.

Do not breathe mist/vapors/spray.

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

Wearing of suitable protective equipment (including personal protective equipment referred to under Section 8 of the safety data sheet) to prevent any contamination of skin, eyes and personal clothing.

#### For emergency responders

Wear breathing apparatus if exposed to vapors/dust/aerosols/gases.

### 6.2 Environmental precautions

Keep away from drains, surface and ground water.

Retain contaminated washing water and dispose of it.

If substance has entered a water course or sewer, inform the responsible authority.

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## 6.3 Methods and material for containment and cleaning up

### Advice on how to contain a spill

Take up mechanically.

### Advice on how to clean up a spill

Take up mechanically.

Collect spillage.

### Appropriate containment techniques

Neutralization techniques.

### Other information relating to spills and releases

Place in appropriate containers for disposal.

Ventilate affected area.

## 6.4 Reference to other sections

Hazardous combustion products: see section 5.

Personal protective equipment: see section 8.

Incompatible materials: see section 10.

Disposal considerations: see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

#### Measures to prevent fire as well as aerosol and dust generation

Use local and general ventilation.

Keep away from sources of ignition - No smoking.

#### Specific notes/details

None.

#### Handling of incompatible substances or mixtures

Do not mix with acids.

#### Measures to protect the environment

Avoid release to the environment.

#### Advice on general occupational hygiene

Do not eat, drink and smoke in work areas.

Remove contaminated clothing and protective equipment before entering eating areas.

Do not breathe mist/vapors/spray.

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

Wash hands thoroughly after handling.

Preventive skin protection (barrier creams/ointments) is recommended.

### 7.2 Conditions for safe storage, including any incompatibilities

#### Flammability hazards

Keep away from sources of ignition - No smoking.

#### Incompatible substances or mixtures

Incompatible materials: see section 10.

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## Protect against external exposure, such as

heat

## Consideration of other advice

Keep away from food, drink and animal feedingstuffs.

## Ventilation requirements

Provision of sufficient ventilation.

## Specific designs for storage rooms or vessels

Store in a dry place. Store in a closed container.

Store in a well-ventilated place. Keep cool.

## Storage temperature

minimum storage temperature: 20 °C

maximum storage temperature: 40 °C

## Packaging compatibilities

Keep only in original container.

## 7.3 Specific end use(s)

No information available.

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

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

Occupational exposure limit values (Workplace Exposure Limits)									
Country	Name of agent	CAS No	Identifier	TWA [ppm]	TWA [mg/m <sup>3</sup> ]	STEL [ppm]	STEL [mg/m <sup>3</sup> ]	Notation	Source
US	diethanolamine	111-42-2	REL	3 (10 h)	15 (10 h)	-	-	-	NIOSH REL
US	diethanolamine	111-42-2	PEL (CA)	0.46	2	-	-	H	Cal/OSHA PEL
US	diethanolamine	111-42-2	TLV®	-	1	-	-	iv, H	ACGIH® 2024

#### Notation

H absorbed through the skin

iv inhalable fraction and vapor

STEL short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period (unless otherwise specified)

TWA time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average (unless otherwise specified)

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## 8.2 Exposure controls

### Appropriate engineering controls

Use local and general ventilation.

### Individual protection measures (personal protective equipment)

#### Eye/face protection

Wear eye/face protection.

#### Hand protection

Protective gloves		
Material	Material thickness	Breakthrough times of the glove material
CR: chloroprene (chlorobutadiene) rubber	≥ 0,5 mm	no information available
IIR: isobutene-isoprene (butyl) rubber	≥ 0,5 mm	no information available
NR: natural rubber, latex	≥ 0,5 mm	no information available

Wear suitable gloves.

Chemical protection gloves are suitable, which are tested according to EN 374.

Check leak-tightness/impermeability prior to use.

For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

#### Body protection

Protective clothing for use against solid particulates.

#### Respiratory protection

In case of inadequate ventilation wear respiratory protection.

Type : A (against organic gases and vapors with a boiling point of > 65 °C , color code: Brown).

#### Environmental exposure controls

Use appropriate container to avoid environmental contamination.

Keep away from drains, surface and ground water.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical state</b>	solid Solid matter viscous
<b>Color</b>	colorless
<b>Odor</b>	Ammonia-like
<b>Odor threshold</b>	not determined

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## Other safety parameters

<b>pH (value)</b>	11 (in aqueous solution: 53 g/l, 20 °C)
<b>Melting point/freezing point</b>	27 – 28 °C
<b>Boiling point or initial boiling point and boiling range</b>	269.9 °C
<b>Flash point</b>	176 °C
<b>Evaporation rate</b>	<0.01 (n-butyl acetate = 1)
<b>Flammability (solid, gas)</b>	this material is combustible, but will not ignite readily

## Explosive limits

<b>Vapor pressure</b>	<1.3 Pa at 60 °C
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## Density and/or relative density

Density	1.1 g/cm <sup>3</sup> at 23.8 °C
Relative density	3.6 – 3.7 (air = 1) 1.1 (water = 1)
Relative density / Relative vapour density	3.6 – 3.7 (air = 1) 1.1 (water = 1)

## Solubility(ies)

Water solubility	1,000 g/l at 20 °C
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## Partition coefficient

n-octanol/water (log KOW)	-2.46 (25 °C)
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## Soil organic carbon/water (log KOC)

1  
(ECHA)

## Auto-ignition temperature

not determined

## Decomposition temperature

269 °C

## Viscosity

not relevant  
(solid)

## Explosive properties

none

## Oxidizing properties

none

## Information for relevant hazard classes according to GHS

hazard classes acc. to GHS (physical hazards):  
not relevant

## 9.2 Other information

Temperature class (USA, acc. to NEC 500)	T2 (maximum permissible surface temperature on the equipment: 300°C)
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## SECTION 10: Stability and reactivity

### 10.1 Reactivity

This material is not reactive under normal ambient conditions.

### 10.2 Chemical stability

The material is stable under normal ambient and anticipated storage and handling conditions of temperature and pressure.

See below "Conditions to avoid".

### 10.3 Possibility of hazardous reactions

In case of insufficient ventilation and/or in use, may form flammable/explosive vapor-air mixture.

### 10.4 Conditions to avoid

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

UV-radiation/sunlight.

Protect from moisture.

### 10.5 Incompatible materials

water, acids, oxidizers, metals, halogen, humidity

### 10.6 Hazardous decomposition products

Reasonably anticipated hazardous decomposition products produced as a result of use, storage, spill and heating are not known.

Hazardous combustion products: see section 5.

## SECTION 11: Toxicological information

### 11.1 Information on toxicological effects

If not otherwise specified the classification is based on:

Animal studies; Evidence from any other toxicity tests; Expert judgment (weight of evidence determination).

#### Classification acc. to OSHA "Hazard Communication Standard" (29 CFR 1910.1200)

##### Acute toxicity

Shall not be classified as acutely toxic (dermal).

Harmful if swallowed.

Exposure route	Endpoint	Value	Species	Method
dermal	LD50	12,970 mg/kg	rabbit	-
oral	LD50	1,600 mg/kg	rat	OECD Guideline 401

##### Skin corrosion/irritation

Causes skin irritation.

##### Serious eye damage/eye irritation

Causes serious eye damage.

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## Respiratory or skin sensitization

### Skin sensitization

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

### Respiratory sensitization

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

### Germ cell mutagenicity

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

### Carcinogenicity

Suspected of causing cancer.

### IARC Monographs

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans			
Name of substance	CAS No	Classification	Number
2,2'-Iminodiethanol	111-42-2	2B	-

#### Legend

2B Possibly carcinogenic to humans

### National Toxicology Program (United States)

not listed

### OSHA Carcinogens

Not listed.

### Reproductive toxicity

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

### Specific target organ toxicity - single exposure

Classification could not be established because:

Data are lacking, inconclusive, or conclusive but not sufficient for classification.

### Specific target organ toxicity - repeated exposure

May cause damage to organs (liver, blood, kidney, nervous system) through prolonged or repeated exposure.

Exposure route	Endpoint	Value	Exposure time	Species	Method
oral	LOAEL	14 mg/kg bw/day	90 d	rat, male	OECD Guideline 408
oral	LOAEL	25 mg/kg bw/day	90 d	rat, female	OECD Guideline 408

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Exposure route	Endpoint	Value	Exposure time	Species	Method
oral	LOAEL	104 mg/kg bw/day	90 d	mouse, male	OECD Guideline 408
oral	LOAEL	142 mg/kg bw/day	90 d	mouse, female	OECD Guideline 408
dermal	LOAEL	32 mg/kg bw/day	90 d	rat	OECD Guideline 411
inhalation: dust/mist	NOAEC	3 mg/m <sup>3</sup>	90 d	rat	OECD Guideline 413
inhalation: dust/mist	LOAEC	15 mg/m <sup>3</sup>	90 d	rat	OECD Guideline 413

## Aspiration hazard

Shall not be classified as presenting an aspiration hazard.

## 11.2 Other information

There is no additional information.

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Aquatic toxicity (acute)

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

Endpoint	Exposure time	Value	Species	Method
LC50	96 h	460 mg/l	rainbow trout ( <i>Oncorhynchus mykiss</i> )	Environment Canada method, Biological Test Method: Acute Lethality Test Using Rainbow Trout, EPS 1/RM/9 (EC 1990/1996)
EC50	48 h	30.1 mg/l	<i>Ceriodaphnia dubia</i> (water flea)	acute static toxicity test (ASTM Standard E729-80, 1980)
ErC50	72 h	9.5 mg/l	algae ( <i>pseudokirchneriella subcapitata</i> )	EPA 600/9-78-018

#### Aquatic toxicity (chronic)

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

Endpoint	Exposure time	Value	Species	Method
EC50	21 d	11.82 mg/l	daphnia magna	draft EEC-guideline XI/681/86
NOEC	21 d	0.78 mg/l	daphnia magna	draft EEC-guideline XI/681/86
NOEC	3 d	0.6 mg/l	algae ( <i>pseudokirchneriella</i> )	EPA 600/9-78-018

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Endpoint	Exposure time	Value	Species	Method
			subcapitata)	
LOEC	21 d	1.56 mg/l	daphnia magna	draft EEC-guideline XI/681/86
growth (EbCx) 10%	21 d	1.05 mg/l	daphnia magna	draft EEC-guideline XI/681/86
reproductive output 10%	21 d	1.05 mg/l	daphnia magna	draft EEC-guideline XI/681/86
growth rate (ErCx) 10%	72 h	1.1 mg/l	algae (pseudokirchneriella subcapitata)	EPA 600/9-78-018

## 12.2 Persistence and degradability

### Biodegradation

The substance is readily biodegradable.

Process of degradability			
Process	Degradation rate	Time	Method
oxygen depletion	93 %	28 d	OECD Guideline 301 F

### Persistence

No data available.

## 12.3 Bioaccumulative potential

**n-octanol/water (log KOW)** -2.46 (25 °C)

## 12.4 Mobility in soil

The substance has the potential after release to the environment, to move under natural forces to the groundwater or to a distance from the site of release.

**Henry's law constant**  $0 \text{ Pa m}^3/\text{mol}$  at 25 °C

**The Organic Carbon normalised adsorption coefficient** 1

## 12.5 Results of PBT and vPvB assessment

According to the results of its assessment, this substance is not a PBT or a vPvB.

## 12.6 Other adverse effects

Data are not available.

### Remarks

Keep away from drains, surface and ground water.

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

Dispose of contents/container in accordance with local/regional/national/international regulations.

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## Sewage disposal-relevant information

Do not empty into drains.

## Waste treatment of containers/packages

Completely emptied packages can be recycled.

Handle contaminated packages in the same way as the substance itself.

## Remarks

Please consider the relevant national or regional provisions.

## SECTION 14: Transport information

**14.1 UN number** not assigned

**14.2 UN proper shipping name** -

**14.3 Transport hazard class(es)** -

**14.4 Packing group** -

**14.5 Environmental hazards** -

**14.6 Special precautions for user** -

**14.7 Transport in bulk according to IMO instruments** -

## 14.8 Information for each of the UN Model Regulations

### Transport of dangerous goods by road or rail (49 CFR US DOT) Additional information

Not subject to transport regulations.

## SECTION 15: Regulatory information

### 15.1 Safety, health and environmental regulations specific for the product in question

#### National regulations (United States)

**Toxic Substance Control Act (TSCA)** Substance is listed (ACTIVE)

#### Superfund Amendment and Reauthorization Act (SARA TITLE III )

#### The List of Extremely Hazardous Substances and Their Threshold Planning Quantities (EPCRA Section 302, 304)

Not listed

#### Specific Toxic Chemical Listings (EPCRA Section 313)

Toxics Release Inventory: Specific Toxic Chemical Listings				
Name of substance	Name acc. to inventory	CAS No	Remarks	Effective date
2,2'-Iminodiethanol	diethanolamine	111-42-2	-	1987-01-01

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## Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

### List of Hazardous Substances and Reportable Quantities (CERCLA section 102a) (40 CFR 302.4)

Name of substance	Name acc. to inventory	CAS No	Re- marks	Stat- utory code	Final RQ pounds (Kg)
2,2'-Iminodiethanol	diethanolamine	111-42-2	-	3	100 (45,4)

#### Legend

3 "3" indicates that the source is section 112 of the Clean Air Act

## Clean Air Act

Not listed

## Right to Know Hazardous Substance List

### Toxic or Hazardous Substance List (MA-TURA)

Name of substance	Name acc. to inventory	CAS No	DEP CODE	PBT / HHS / LHS	PBT / HHS Thres hold	De Minimis Concentra- tion Threshold
2,2'-Iminodiethanol	Diethanolamine	111-42-2	-	-	-	1.0 %

### Hazardous Substances List (MN-ERTK)

Name of substance	Name acc. to inventory	CAS No	References	Remarks
2,2'-Iminodiethanol	Diethanolamine	111-42-2	A	-

#### Legend

A American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices for 1992-93", available from ACGIH

### Hazardous Substance List (NJ-RTK)

Name of substance	Name acc. to in- ventory	CAS No	Remarks	Classifica- tions	Listed in	Sub- stanc e num- ber	DOT num- ber
2,2'-Iminodiethanol	diethanolamine	111- 42-2	-	CO.	2 3 4 6 7 15 17 18 20	0686	1760

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## Legend

- 15 "Fire Protection Guide to Hazardous Materials," N FPA 49 (Hazardous Chemicals Data), NFPA 325 (Guide to Fire Hazard Properties of Flammable Liquids, Gases, and Volatile Solids), and NFPA 704 (Standard System for the Identification of the Hazards of Materials for Emergency Response), National Fire Protection Association (NFPA), 2001.
- 17 "2008 Emergency Response Guidebook," Research and Special Programs Administration, U.S. Department of Transportation, 2008.
- 18 List of Toxics Release Inventory Chemicals, Section 313, Emergency Planning and Community Right to Know Act (EPCRA), Toxics Release Inventory (TRI) Program, U.S. Environmental Protection Agency, 40 CFR 372.65, July 1, 2008.
- 2 "2009 TLVs® and BEIs®, Threshold Limit Values and Biological Exposure Indices," American Conference of Governmental Industrial Hygienists (ACGIH), 2009.
- 20 List of Hazardous Substances and Reportable Quantities (RQ) , Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), U.S. Environmental Protection Agency, 40 CFR 302, Table 302.4, July 1, 2008.
- 3 Office of Hazardous Materials Safety, Research and Special Programs Administration, U.S. Department of Transportation, 49 CFR 172.101-Hazardous Materials Table, October 1, 2008.
- 4 "NIOSH Pocket Guide to Chemical Hazards," National Institute for Occupational Safety and Health (NIOSH), U.S. Department of Health and Human Services, No. 2005-149, September 2005.
- 6 "Environmental Hazardous Substance List," New Jersey Department of Environmental Protection, N.J.A.C. 7:1G-2, as printed in the Community Right to Know Survey Instruction Book, 2008.
- 7 IARC Monographs on the Evaluation of Carcinogenic Risks to Humans, "All Supplements, All Volumes, Groups 1, 2A, 2B, and 3, International Agency for Research on Cancer (IARC), World Health Organization, 2008.
- CO Corrosive

## Hazardous Substance List (Chapter 323) (PA-RTK)

Name acc. to inventory	CAS No	Classification
ETHANOL, 2,2'-IMINOBIS-	111-42-2	E

## Legend

- E Environmental hazard

## Hazardous Substance List (RI-RTK)

Name of substance	Name acc. to inventory	CAS No	References
2,2'-Iminodiethanol	Diethanolamine	111-42-2	T, F

## Legend

- F Flammability (NFPA®)
- T Toxicity (ACGIH®)

## California Environmental Protection Agency (Cal/EPA): Proposition 65 - Safe Drinking Water and Toxic Enforcement Act of 1987

Proposition 65 List of chemicals			
Name acc. to inventory	CAS No	Remarks	Type of the toxicity
diethanolamine	111-42-2	-	cancer

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## Drug precursors, Chemicals designated within the Controlled Substances Act, 21 U.S.C. § 802, paragraphs 34 (list I) and 35 (list II)

Not listed

### SECTION 16: Other information, including date of preparation or last revision

Date of preparation: 2024-10-11

#### Abbreviations and acronyms

Abbr.	Descriptions of used abbreviations
49 CFR US DOT	49 CFR U.S. Department of Transportation
ACGIH®	American Conference of Governmental Industrial Hygienists
ACGIH® 2024	From ACGIH®, 2024 TLVs® and BEIs® Book. Copyright 2024. Reprinted with permission. Information on the proper use of the TLVs® and BEIs®: <a href="http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement">http://www.acgih.org/tlv-bei-guidelines/policies-procedures-presentations/tlv-bei-position-statement</a>
Cal/OSHA PEL	California Division of Occupational Safety and Health (Cal/OSHA): Permissible Exposure Limits (PELs)
CAS	Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)
DEP CODE	Department of Environmental Protection Code
DGR	Dangerous Goods Regulations (see IATA/DGR)
EC50	Effective Concentration 50 %. The EC50 corresponds to the concentration of a tested substance causing 50 % changes in response (e.g. on growth) during a specified time interval
ErC50	≡ EC50: in this method, that concentration of test substance which results in a 50 % reduction in either growth (EbC50) or growth rate (ErC50) relative to the control
GHS	"Globally Harmonized System of Classification and Labelling of Chemicals" developed by the United Nations
HHS	Higher hazard substance
IARC	International Agency for Research on Cancer
IARC Monographs	IARC Monographs on the Evaluation of Carcinogenic Risks to Humans
IATA	International Air Transport Association
IATA/DGR	Dangerous Goods Regulations (DGR) for the air transport (IATA)
IMDG	International Maritime Dangerous Goods Code
LC50	Lethal Concentration 50%: the LC50 corresponds to the concentration of a tested substance causing 50 % lethality during a specified time interval
LD50	Lethal Dose 50 %: the LD50 corresponds to the dose of a tested substance causing 50 % lethality during a specified time interval
LHS	Lower hazard substance
LOAEC	Lowest Observed Adverse Effect Concentration
LOAEL	Lowest Observed Adverse Effect Level
LOEC	Lowest Observed Effect Concentration



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<b>Abbr.</b>	<b>Descriptions of used abbreviations</b>
NFPA®	National Fire Protection Association (United States)
NIOSH REL	National Institute for Occupational Safety and Health (NIOSH): Recommended Exposure Limits (RELs)
NOAEC	No Observed Adverse Effect Concentration
NOEC	No Observed Effect Concentration
OSHA	Occupational Safety and Health Administration (United States)
PBT	Persistent, Bioaccumulative and Toxic
ppm	Parts per million
STEL	Short-term exposure limit
TLV®	Threshold Limit Values
TWA	Time-weighted average
vPvB	Very Persistent and very Bioaccumulative

## Key literature references and sources for data

OSHA Hazard Communication Standard (HCS), 29 CFR 1910.1200.

Transport of dangerous goods by road or rail (49 CFR US DOT).

International Maritime Dangerous Goods Code (IMDG).

Dangerous Goods Regulations (DGR) for the air transport (IATA).

## List of relevant phrases (code and full text as stated in section 2 and 3)

<b>Code</b>	<b>Text</b>
H302	Harmful if swallowed.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
H373	May cause damage to organs (liver, blood, kidney, nervous system) through prolonged or repeated exposure.

## Responsible for the safety data sheet

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## Disclaimer

This information is based upon the present state of our knowledge.

This SDS has been compiled and is solely intended for this product.