Safety Data Sheet
Ethylenediamine

1. Identification

Product identifier used on the label

Ethylenediamine

Recommended use of the chemical and restriction on use

* The “Recommended use” identified for this product is provided solely to comply with a US Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:
Solvay USA
312 N Oak St
Roanoke, TX 76262
Ph# 817-491-2800

Emergency telephone number

CHEMTREC: 1-800-424-9300

Other means of identification

Molecular formula:	C(2)H(8)N(2)
Chemical family:	diamines
Synonyms:	ethylenediamine Use: Chemical used in synthesis and/or formulation of industrial products.

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

Flam. Liq.	3	Flammable liquid
Acute Tox.	4 (Inhalation - vapour)	Acute toxicity
Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	3 (dermal)	Acute toxicity
Skin Corr./Irrit.	1B	Skin corrosion/irritation
Eye Dam./Irrit.	1	Serious eye damage/eye irritation
Resp. Sens.	1B	Respiratory sensitization

Skin Sens.	1B	Skin sensitization

Label elements

Pictogram:

Signal Word:
Danger

Hazard Statement:

H226	Flammable liquid and vapour.
H311	Toxic in contact with skin.
H332	Harmful if inhaled.
H302	Harmful if swallowed.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H317	May cause an allergic skin reaction.
H314	Causes severe skin burns and eye damage.

Precautionary Statements (Prevention):

P280	Wear protective gloves/protective clothing/eye protection/face protection.
P271	Use only outdoors or in a well-ventilated area.
P260	Do not breathe dust or mist.
P210	Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P260	Do not breathe mist or vapour.
P243	Take precautionary measures against static discharge.
P284	[In case of inadequate ventilation] wear respiratory protection.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P272	Contaminated work clothing should not be allowed out of the workplace.
P264	Wash with plenty of water and soap thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P233	Keep container tightly closed.
P242	Use only non-sparking tools.
P240	Ground/bond container and receiving equipment.

Precautionary Statements (Response):

P310	Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P341 + P311	IF INHALED: If breathing is difficult, remove to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician.
P303 + P361 + P352	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P301 + P330 + P331	IF SWALLOWED: rinse mouth. Do NOT induce vomiting.
P362 + P364	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use water spray, dry powder, foam or carbon dioxide for extinction.

Precautionary Statements (Storage):

P405	Store locked up.
P403 + P235	Store in a well-ventilated place. Keep cool.

Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.

Hazards not otherwise classified

If applicable information is provided in this section on other hazards which do not result in classification but which may contribute to the overall hazards of the substance or mixture.

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Emergency overview

DANGER:
CORROSIVE.
FLAMMABLE LIQUID.
SENSITIZER.
Corrosive to skin and/or eyes.
Causes severe burns.
RISK OF SERIOUS DAMAGE TO EYES.
MAY BE HARMFUL IF SWALLOWED.
INGESTION MAY CAUSE GASTRIC DISTURBANCES.
HARMFUL IF INHALED.
TOXIC IF ABSORBED THROUGH SKIN.
Respiratory and skin sensitizer
Avoid all sources of ignition: heat, sparks, open flame.
Avoid contact with the skin, eyes and clothing.
Wear a NIOSH-certified (or equivalent) organic vapour respirator.
Wear NIOSH-certified chemical goggles.
Wear full face shield if splashing hazard exists.
Wear chemical resistant protective gloves.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

CAS Number	Content (W/W)	Chemical name
107-15-3	>= 99.5 - <= 100.0 %	ethylenediamine

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

CAS Number	Content (W/W)	Chemical name
107-15-3	>= 80.0 - <= 100.0 %	ethylenediamine

4. First-Aid Measures

Description of first aid measures

General advice:
First aid personnel should pay attention to their own safety. If the patient is likely to become unconscious, place and transport in stable sideways position (recovery position). Immediately remove contaminated clothing.

If inhaled:
Immediately administer a corticosteroid from a controlled/metered dose inhaler. Keep patient calm, remove to fresh air, seek medical attention.

If on skin:
Immediately wash thoroughly with plenty of water, apply sterile dressings, consult a skin specialist.

If in eyes:
Immediately wash affected eyes for at least 15 minutes under running water with eyelids held open, consult an eye specialist.

If swallowed:
Immediately rinse mouth and then drink 200-300 ml of water, seek medical attention.

Most important symptoms and effects, both acute and delayed

Symptoms: The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further symptoms are possible

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment:	Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
water spray, foam, dry powder, gaseous extinguishing media, carbon dioxide

Unsuitable extinguishing media for safety reasons:
water

Special hazards arising from the substance or mixture

Hazards during fire-fighting:
No particular hazards known.

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:
If exposed to fire, keep containers cool by spraying with water.

Impact Sensitivity:

Remarks:	Based on the chemical structure there is no shock-sensitivity.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures
Ensure adequate ventilation. Avoid inhalation. Avoid contact with the skin, eyes and clothing.

Ensure adequate ventilation. Wear appropriate respiratory protection. Extinguish sources of ignition nearby and downwind.

Environmental precautions
Substance/product is RCRA hazardous due to its properties. Do not discharge into drains/surface waters/groundwater.

Methods and material for containment and cleaning up
Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and Storage

Precautions for safe handling
See MSDS section 10 - Stability and reactivity. See MSDS section 5 - Fire fighting measures. Containers should be opened carefully in well-ventilated areas to avoid static discharge.

Protection against fire and explosion:
See MSDS section 5 - Fire fighting measures. Avoid all sources of ignition: heat, sparks, open flame. Take precautionary measures against static discharges.

Conditions for safe storage, including any incompatibilities
Segregate from acids and acid forming substances.

Suitable materials for containers: Carbon steel (Iron), Stainless steel 1.4541, Stainless steel 1.4571

Further information on storage conditions: Containers should be stored tightly sealed in a dry place.

Storage stability:
Storage temperature: <= 33 °C
Storage duration: 6 Months
From the data on storage duration in this safety data sheet no agreed statement regarding the warrantee of application properties can be deduced.

8. Exposure Controls/Personal Protection

Advice on system design:
Provide local exhaust ventilation to control vapours/mists.

Personal protective equipment

Respiratory protection:
Wear a NIOSH-certified (or equivalent) amine/organic vapor respirator.

Hand protection:
Chemical resistant protective gloves

Eye protection:
Wear face shield or tightly fitting safety goggles (chemical goggles) if splashing hazard exists.

Body protection:
Body protection must be chosen depending on activity and possible exposure, e.g. apron, protecting boots, chemical-protection suit (according to EN 14605 in case of splashes or EN ISO 13982 in case of dust).

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General safety and hygiene measures:
Eye wash fountains and safety showers must be easily accessible. Wear protective clothing as necessary to prevent contact. Employees should shower at the end of the shift. Wash soiled clothing immediately. When using, do not eat, drink or smoke. Gloves must be inspected regularly and prior to each use. Replace if necessary (e.g. pinhole leaks). Hands and/or face should be washed before breaks and at the end of the shift. Take off immediately all contaminated clothing. Wash contaminated clothing before reuse.

9. Physical and Chemical Properties

Form:	liquid	
Odour:	amine-like	
Odour threshold:		Not determined due to breath way sensitizing properties.
Colour:	colourless to yellow	
pH value:	12.2	(110 g/l)
Melting point:	11.1 °C	(DTA) Literature data.
Boiling point:	117.1 °C	(measured)
Flash point:	38 °C	(DIN 51755, closed cup)
Flammability:	Flammable.	
Lower explosion limit:		For liquids not relevant for classification and labelling. The lower explosion point may be 5 - 15 °C below the flash point.
Upper explosion limit:		For liquids not relevant for classification and labelling.
Autoignition:	385 °C	Literature data.
Vapour pressure:	70 mbar	(50 °C)
Density:	899.9 kg/m3	(15 °C)
	896.8 kg/m3	(20 °C) (pyknometer) liquid
	870.3 kg/m3	(50 °C)
Relative density:	0.9	(20 °C)
Partitioning coefficient n-octanol/water (log Pow):	-2 - -1.3	(measured)
Self-ignition temperature:		Based on its structural properties the product is not classified as self-igniting.
Thermal decomposition:	120 °C, 15 kJ/kg (DSC (DIN 51007)) It is not a self-decompositionable substance.	
Viscosity, dynamic:	1.265 - 1.725 mPa.s	(25 °C) Literature data.
Particle size:		The substance / product is marketed or used in a non solid or granular form.
Solubility in water:	1,000 g/l	miscible, Literature data.
Molar mass:	60.10 g/mol	
Evaporation rate:		Value can be approximated from Henry's Law Constant or vapor pressure.

10. Stability and Reactivity

Reactivity

Corrosion to metals:
No corrosive effect on metal.

Oxidizing properties:
Based on its structural properties the product is not classified as oxidizing.

Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.

Chemical stability

Possibility of hazardous reactions
The product is chemically stable.

Conditions to avoid
Avoid extreme heat.

Incompatible materials
Aluminum, zinc, polyvinylchloride, acids, acid forming substances

Hazardous decomposition products

Decomposition products:
carbon monoxide, carbon dioxide
Possible thermal decomposition products: carbon oxides, nitrogen oxides

Thermal decomposition:
120 °C (DSC (DIN 51007))
It is not a self-decompositionable substance.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity
Assessment of acute toxicity: Of moderate toxicity after single ingestion. Of pronounced toxicity after short-term skin contact. Of moderate toxicity after short-term inhalation.

Information on: Ethylenediamine

Oral
Type of value: LD50
Species: rat (male/female)
Value: 866 mg/kg (similar to OECD guideline 401)

Inhalation
Type of value: LC50
Species: rat
Value: 14.7 mg/l (similar to OECD guideline 403)
Exposure time: 4 h
The vapour was tested.

Dermal
Type of value: LD50
Species: rabbit
Value: 560 mg/kg

Assessment other acute effects
Assessment of STOT single:
Based on the available information there is no specific target organ toxicity to be expected after a single exposure.

Irritation / corrosion
Assessment of irritating effects: Corrosive! Damages skin and eyes.

Information on: Ethylenediamine

Skin
Species: rabbit
Result: Corrosive.
Method: Test

Eye
Species: rabbit
Result: Corrosive.
Method: Test

Sensitization
Assessment of sensitization: The substance may cause sensitization of the respiratory tract.
Sensitization after skin contact possible.

Guinea pig maximization test
Species: guinea pig
Result: sensitizing
Method: other

Aspiration Hazard
No aspiration hazard expected.

Chronic Toxicity/Effects

Repeated dose toxicity
Assessment of repeated dose toxicity: The substance may cause damage to the lung after repeated inhalation.
No substance-specific organtoxicity was observed after repeated administration to animals. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

Information on: Ethylenediamine

Genetic toxicity
Assessment of mutagenicity: The substance was mutagenic in various test systems with microorganisms and cell cultures; however, these results could not be confirmed in tests with mammals. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

Carcinogenicity
Assessment of carcinogenicity: In long-term studies in rats in which the substance was given by feed, a carcinogenic effect was not observed. Dermal exposure is not expected to be carcinogenic. The product has not been fully tested. The statements have been derived in parts from products of a similar structure or composition.

Reproductive toxicity
Assessment of reproduction toxicity: The results of animal studies gave no indication of a fertility impairing effect. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Teratogenicity
Assessment of teratogenicity: Animal studies gave no indication of a developmental toxic effect at doses that were not toxic to the parental animals. The product has not been tested. The statement has been derived from substances/products of a similar structure or composition.

Symptoms of Exposure

The most important known symptoms and effects are described in the labelling (see section 2) and/or in section 11., Further symptoms are possible

Medical conditions aggravated by overexposure
Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See MSDS section 11 - Toxicological information.

12. Ecological Information

Toxicity

Aquatic toxicity
Assessment of aquatic toxicity:
Acutely harmful for aquatic organisms. Depending on local conditions and existing concentrations, disturbances in the biodegradation process of activated sludge are possible.

Toxicity to fish
LC50 (96 h) 640 mg/l, Poecilia reticulata (Directive 92/69/EEC, C.1, semistatic)
Nominal concentration.

Aquatic invertebrates
EC50 (48 h) 16.7 mg/l, Daphnia magna (Directive 92/69/EEC, C.2, static)
Nominal concentration.

Aquatic plants
EC50 (72 h) 645 mg/l (growth rate), Selenastrum capricornutum (Guideline 92/69/EEC, C.3, static)
Nominal concentration.

No observed effect concentration (72 h) approx. 3.2 mg/l (growth rate), Selenastrum capricornutum (Guideline 92/69/EEC, C.3, static)
Nominal concentration.

Chronic toxicity to fish
No observed effect concentration (28 d) > 10 mg/l, Gasterosteus aculeatus (OECD Guideline 210, semistatic)
Nominal concentration.

Chronic toxicity to aquatic invertebrates
No observed effect concentration (21 d) 0.16 mg/l, Daphnia magna (Daphnia test chronic, semistatic)
Nominal concentration.

Assessment of terrestrial toxicity
Study not necessary due to exposure considerations.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms
nitrifying bacteria/EC10 (2 h): 0.5 mg/l
Nominal concentration.

DIN EN ISO 10712 bacterium/EC50 (17 h): 29 mg/l
Nominal concentration. Literature data.

OECD Guideline 209 activated sludge, domestic/EC20 (60 min): 1,600 mg/l
Nominal concentration. Literature data.

Persistence and degradability

Assessment biodegradation and elimination (H2O)
Readily biodegradable (according to OECD criteria).

Elimination information

95 % BOD of the ThOD (28 d) (Directive 92/69/EEC, C.4-E) (aerobic, activated sludge, domestic, non-adapted)

Assessment of stability in water
According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Assessment bioaccumulation potential
Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Mobility in soil

Assessment transport between environmental compartments
The substance will not evaporate into the atmosphere from the water surface.
Adsorption to solid soil phase is expected.

Additional information

Adsorbable organically-bound halogen (AOX):
This product contains no organically-bound halogen.

Other ecotoxicological advice:
Due to the pH-value of the product, neutralization is generally required before discharging sewage into treatment plants.

13. Disposal considerations

Waste disposal of substance:
Incinerate or dispose of in a RCRA-licensed facility. Do not discharge into waterways or sewer systems without proper authorization.

Container disposal:
Empty containers with less than 1 inch of residue may be landfilled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: D001

14. Transport Information

Land transport
USDOT

Hazard class:	8
Packing group:	II
ID number:	UN 1604
Hazard label:	8, 3
Proper shipping name:	ETHYLENEDIAMINE

Sea transport
IMDG

Hazard class:	8
Packing group:	II
ID number:	UN 1604
Hazard label:	8, 3
Marine pollutant:	NO
Proper shipping name:	ETHYLENEDIAMINE

Air transport
IATA/ICAO

Hazard class:	8
Packing group:	II
ID number:	UN 1604
Hazard label:	8, 3
Proper shipping name:	ETHYLENEDIAMINE

15. Regulatory Information

Federal Regulations

Registration status:

Chemical	TSCA, US	released / listed

EPCRA 311/312 (Hazard categories): Acute; Chronic; Fire

CERCLA RQ	CAS Number	Chemical name
5000 LBS	107-15-3	ethylenediamine

Reportable Quantity for release: 100 lb

State regulations

State RTK	CAS Number	Chemical name
MA, NJ, PA	107-15-3	ethylenediamine

NFPA Hazard codes:
Health : 3 Fire: 3 Reactivity: 0 Special:

HMIS III rating
Health: 3¤ Flammability: 3 Physical hazard: 0

Assessment of the hazard classes according to UN GHS criteria (most recent version):

Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	3 (dermal)	Acute toxicity
Skin Corr./Irrit.	1B	Skin corrosion/irritation
Resp. Sens.	1B	Respiratory sensitization
Skin Sens.	1B	Skin sensitization
Flam. Liq.	3	Flammable liquid
Aquatic Acute	3	Hazardous to the aquatic environment - acute
Aquatic Chronic	3	Hazardous to the aquatic environment - chronic
Acute Tox.	4 (Inhalation - vapour)	Acute toxicity
Eye Dam./Irrit.	1	Serious eye damage/eye irritation

16. Other Information

We support worldwide Responsible Care® initiatives. We value the health and safety of our employees, customers, suppliers and neighbors, and the protection of the environment. Our commitment to Responsible Care is integral to conducting our business and operating our facilities in a safe and environmentally responsible fashion, supporting our customers and suppliers in ensuring the safe and environmentally sound handling of our products, and minimizing the impact of our operations on society and the environment during production, storage, transport, use and disposal of our products.

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