MATERIAL SAFETY DATA SHEET (MSDS)

SECTION 1: Identification

1.1 Product identifiers

Product Name : **Ethylenediamine**

Cat No.: **E479-4; E479-500; S80006**

CAS No. : 107-15-3

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

Recommended uses : Laboratory chemicals

Uses advised against: Food, drug, pesticide or biocidal product use.

1.3 Details of the supplier of the safety data sheet

Company : Krishna Solvechem Limited.
B/503, Sahayog, S. V. Road,
Kandivali (West), Mumbai – 400067. India.

Telephone : +91-22-6123 0222

Email : exports@kscl.co.in

1.4 Emergency telephone number

Emergency Phone : +91-8657457330

SECTION 2: Hazards identification

2.1 Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	(Category 3)
Acute oral and dermal toxicity	(Category 4)
Skin Corrosion/Irritation	(Category 1B)
Serious Eye Damage/Eye Irritation	(Category 1)
Respiratory and skin sensitization	(Category 1)
Specific target organ toxicity (single exposure)	(Category 3)
Target Organs - Respiratory system.	

2.2 Label elements

Pictogram :

Signal word Danger

Hazard statement (s) Flammable liquid and vapor

	Causes severe skin burns and eye damage May cause respiratory irritation May cause an allergic skin reaction May cause allergy or asthma symptoms or breathing difficulties if inhaled Harmful if swallowed or in contact with skin
Precautionary statement (s)	
Prevention	
	Wash face, hands and any exposed skin thoroughly after handling Wear protective gloves/protective clothing/eye protection/face protection Avoid breathing dust/fume/gas/mist/vapors/spray Use only outdoors or in a well-ventilated area Keep away from heat/sparks/open flames/hot surfaces. - No smoking Keep container tightly closed Ground/bond container and receiving equipment Use explosion-proof electrical/ventilating/lighting/equipment Use only non-sparking tools Take precautionary measures against static discharge Keep cool **Inhalation :** IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing Call a POISON CENTER or doctor/physician if you feel unwell **IF ON SKIN (or hair):** If skin irritation occurs: Get medical advice/attention IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower Wash contaminated clothing before reuse **Eyes:** IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing If eye irritation persists: Get medical advice/attention **Ingestion:** Rinse mouth. Do NOT induce vomiting **Fire** In case of fire: Use CO2, dry chemical, or foam for extinction **Storage:** Store locked up Store in a well-ventilated place. Keep container tightly closed

		Disposal: Dispose of contents/container to an approved waste disposal plant
	Hazards not otherwise classified (HNOC)	None identified

SECTION 3: Composition / information on ingredients

3.1

Component	CAS-No	Weight %
Ethylene diamine	107-15-3	99.7

SECTION 4: First aid measures

4.1	**Description of first aid measures**	
	General Advice:	If symptoms persist, call a physician.
	If inhalation :	If not breathing, give artificial respiration. Remove from exposure, lie down. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respirationwith the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Call a physician immediately.
	In case of skin contact :	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
	In case of eye contact :	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.
	Ingestion :	Clean mouth with water and Do NOT induce vomiting
4.2	**Most important symptoms**	Causes burns by all exposure routes. Difficulty in breathing. May cause allergy or asthma symptoms or breathing difficulties if inhaled. May cause allergic skin reaction. Symptoms ofoverexposure may be headache, dizziness, tiredness, nausea and vomiting: Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforationof stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptoms of allergic reaction mayinclude rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
4.3	**Notes to Physician :**	Treat symptomatically

SECTION 5: Firefighting effects

5.1	**Extinguishing media**	
	Suitable extinguishing media :	Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.
5.2	**Flash Point :**	34 °C / 93.2 °F
	Method :	No information available

	Autoignition Temperature:	385 °C / 725 °F
	Explosion Limits:	
	Upper	14.2 vol%
	Lower	2.6 vol%
	Sensitivity to Mechanical Impact	No information available
	Sensitivity to Static Discharge	No information available
	Specific Hazards Arising from the Chemical :	Thermal decomposition can lead to release of irritating gases and vapors. The product causes burns of eyes, skin and mucous membranes. Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back.
	Hazardous Combustion Products :	Nitrogen oxides (NOx). Ammonia. Hydrogen cyanide (hydrocyanic acid).

5.4 Protective Equipment and Precautions for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA:

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Remove all sources of ignition. Take precautionary measures against static discharges.

6.2 Environmental precautions

Should not be released into the environment. See Section 12 for additional Ecological Information. Do not flush into surface water or sanitary sewer system

6.3 Methods and materials for containment and cleaning up

Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Use only under a chemical fume hood. Do not breathe mist/vapors/spray. Do not ingest. If swallowed then seek immediate medical assistance. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.

7.2 Conditions for safe storage

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area. Corrosives area. Incompatible Materials. Acids.Acid anhydrides. Acid chlorides. Oxidizing agent.

SECTION 8: Exposure controls/personal protection

8.1 Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Ethylene diamine	TWA: 10 ppm Skin	(Vacated) TWA: 10 ppm (Vacated) TWA: 25 mg/m^3 TWA: 10 ppm TWA: 25 mg/m^3	IDLH: 1000 ppm TWA: 10 ppm TWA: 25 mg/m^3	TWA: 10 ppm STEL: 3 mg/m^3

Legend
ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

8.2 Exposure controls

Personal protective equipment -

Eye / Face protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin protection and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European StandardEN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice..

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance	Clear viscous Liquid
b) Odour	Ammonia - like
c) Odour Threshold	No information available
d) Ph	11.9 (25 %)
e) Melting point / freezing point	11 °C
f) Initial boiling point and	117 °C

boiling range	
g) Flash point	38 °C
h) Evaporation rate	0.91 (Butyl Acetate = 1.0)
i) Flammability (solid, gas)	Not applicable
j) Upper/lower flammability or explosive limits	14.2 vol% 2.6 vol%
k) Vapour pressure	12 mmHg @ 25 °C
l) Vapour density	2.07 (Air = 1.0)
m) Specific Gravity	0.8980
n) Solubility	soluble in water
o) Partition coefficient: n octanol/water	No data available
p) Auto-ignition temperature	385 °C / 725 °F
q) Decomposition temperature	No information available
r) Viscosity	No information available
s) Molecular formula	C2 H8 N2
t) Molecular Weight	60.1

SECTION 10: Stability and Reactivity

10.1	**Reactive Hazard :**	None known, based on information available
10.2	**Chemical stability :**	Stable under normal conditions.
10.3	**Possibility of hazardous reactions :**	None under normal processing.
10.4	**Conditions to avoid :**	Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products.
10.5	**Incompatible materials:**	Acids, Acid anhydrides, Acid chlorides, Oxidizing agent
10.6	**Hazardous decomposition products :**	Nitrogen oxides (NOx), Ammonia, Hydrogen cyanide (hydrocyanic acid)
10.7	**Hazardous Polymerization**	Hazardous polymerization does not occur

SECTION 11: Toxicological information

11.1

Information on toxicological effects

Acute toxicity:

Product Information:

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylene diamine	637 mg/kg (Rat) 866 mg/kg (Rat)	LD50 = 560 mg/kg (Rabbit)	14.7 mg/L/4h (Rat)

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation : Causes burns by all exposure routes

Sensitization: May cause sensitization by skin contact

Carcinogenicity : The table below indicates whether each agency ha Any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Ethylene diamine	107-15-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects: No information available.

Reproductive Effects: No information available.

Developmental Effects : No information available.

Teratogenicity: No information available.

STOT - single exposure : Respiratory system

STOT - repeated exposure: None known

Aspiration hazard : No information available.

Symptoms / effects,both acute and delayed: Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting:Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation: Symptomsof allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information : No information available

Other Adverse Effects : The toxicological properties have not been fully investigated.

SECTION 12: Ecological information

12.1

Ecotoxicity:

This product contains the following substance(s) which are hazardous for the environment. Contains a substance which is:. Harmful to aquatic organisms. The product contains following substances which are hazardous for the environment

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylene diamine	EC50: = 645 mg/L, 72h(Pseudokirchneriella subcapitata) EC50: = 151 mg/L, 96h(Pseudokirchneriella subcapitata)	LC50: 191 - 254 mg/L, 96hflow-through (Pimephales promelas)LC50: 98.6 - 131.6 mg/L,96h static (Pimephales promelas)LC50: 180 - 560 mg/L, 96hsemi-static (Poecilia reticulata)LC50: = 115.7 mg/L, 96h semi-static (Pimephalespromelas)	EC50 = 20 mg/L 15 min EC50 = 29 mg/L 17 h	EC50: = 17 mg/L, 48h (Daphnia magna)

12.2 Persistence and degradability: Persistence is unlikely

Bioaccumulation/ Accumulation No information available

12.3 Mobility: Will likely be mobile in the environment due to its water solubility. Log pow : -1.221

SECTION 13: Disposal considerations

13.1 Waste treatment methods: Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

SECTION 14: Transport information

14.1 UN number :

DOT : UN1604 TDG : UN1604

IATA : UN1604 IMDG : UN1604

14.2 UN proper shipping name

DOT : ETHYLENEDIAMINE **TDG :** ETHYLENEDIAMINE

IMDG : ETHYLENEDIAMINE **IATA :** ETHYLENEDIAMINE

14.3 Transport hazard class(es) DOT: 8 TDG: 8 IMDG: 8 IATA: 8

14.4 Packaging group: DOT: II TDG: II IMDG: II IATA: II

SECTION 15: Regulatory information

15.1 United states of America Inventory:

Component	CAS No	TSCA	TSCA Inventory notification -Active-Inactive	TSCA - EPA Regulatory Flags
Ethylene diamine	107-15-3	X	ACTIVE	-

Legend:

TSCA - Toxic Substances Control Act, (40 CFR Part 710)

X - Listed

'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories:

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan(ISHL), Australia(AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Ethylene diamine	107-15-3	X	-	203-468-6	X	X	X	X	X	KE-13141

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ethylene diamine	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA

Component	Hazardous Substances RQs	CERCLA EHS RQs
Ethylene diamine	5000 lb	5000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals.

15.2 U.S. State Right-to-Know Regulations:

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylene diamine	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y

DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security - This product contains the following DHS Chemicals.

Component	DHS Chemical Facility Anti-Terrorism Standard
Ethylene diamine	Release STQs - 20000lb

Other International Regulations

Mexico – Grade Serious risk, Grade 3

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Ethylene diamine	107-15-3	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) – Qualifying Quantitiesfor Major Accident Notification	Seveso III Directive (2012/18/EC) – Qualifying Quantitiesfor Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Ethylene diamine	107-15-3	Not applicable	Not applicable	Not applicable	Not applicable

SECTION 16: Other information

16.1 Prepared By: Regulatory affairs
Krishna Solvechem Limited
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Revision Summary: This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under29 C F R 1910.1200 to align with the Globally Harmonized System ofClassification and Labeling of Chemicals (GHS).

16.2 Disclaimer:

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.