Chemical Safety Data Sheet MSDS / SDS

Aziridine SDS

Revision Date:2024-04-25 Revision Number:1

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Product identifier

Product name: Aziridine

CAS: 151-56-4

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

Relevant identified uses: For R&D use only. Not for medicinal, household or other use.

Uses advised against: none

Company Identification

Company: Chemicalbook.in

Address: 5 vasavi Layout Basaveswara Nilayam Pragathi Nagar Hyderabad, India -500090

Telephone: +91 9550333722

SECTION 2: Hazards identification

Classification of the substance or mixture

Flammable liquids, Category 2
Acute toxicity - Category 2, Oral

Acute toxicity - Category 1, Dermal
Skin corrosion, Sub-category 1B
Acute toxicity - Category 2, Inhalation
Germ cell mutagenicity, Category 1B
Carcinogenicity, Category 1B
Hazardous to the aquatic environment, long-term (Chronic) - Category Chronic 2

GHS label elements, including precautionary statements

Pictogram(s)

Signal word Danger

Hazard statement(s)

H225 Highly flammable liquid and vapour
H300 Fatal if swallowed
H310 Fatal in contact with skin
H314 Causes severe skin burns and eye damage
H330 Fatal if inhaled
H340 May cause genetic defects
H350 May cause cancer
H411 Toxic to aquatic life with long lasting effects

Precautionary statement(s)

Prevention

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P240 Ground and bond container and receiving equipment.
P241 Use explosion-proof [electrical/ventilating/lighting/...] equipment.
P242 Use non-sparking tools.
P243 Take action to prevent static discharges.
P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection/...
P264 Wash ... thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P262 Do not get in eyes, on skin, or on clothing.
P260 Do not breathe dust/fume/gas/mist/vapours/spray.
P271 Use only outdoors or in a well-ventilated area.

P284 [In case of inadequate ventilation] wear respiratory protection.
P203 Obtain, read and follow all safety instructions before use.
P273 Avoid release to the environment.

Response

P303+P361+P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse affected areas with water [or shower].
P370+P378 In case of fire: Use ... to extinguish.
P301+P316 IF SWALLOWED: Get emergency medical help immediately.
P321 Specific treatment (see ... on this label).
P330 Rinse mouth.
P302+P352 IF ON SKIN: Wash with plenty of water/...
P316 Get emergency medical help immediately.
P361+P364 Take off immediately all contaminated clothing and wash it before reuse.
P301+P330+P331 IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P363 Wash contaminated clothing before reuse.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P320 Specific treatment is urgent (see ... on this label).
P318 IF exposed or concerned, get medical advice.
P391 Collect spillage.

Storage

P403+P235 Store in a well-ventilated place. Keep cool.
P405 Store locked up.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.

Disposal

P501 Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

Other hazards which do not result in classification

no data available

SECTION 3: Composition/information on ingredients

Substance

Chemical name:	Aziridine
Common names and synonyms:	Aziridine
CAS number:	151-56-4
EC number:	205-793-9
Concentration:	100%

SECTION 4: First aid measures

Description of necessary first-aid measures

If inhaled

Fresh air, rest. Half-upright position. Artificial respiration may be needed. Refer for medical attention.

Following skin contact

Remove contaminated clothes. Rinse skin with plenty of water or shower. Refer for medical attention .

Following eye contact

First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then refer for medical attention.

Following ingestion

Rinse mouth. Do NOT induce vomiting. Give one or two glasses of water to drink. Refer for medical attention .

Most important symptoms/effects, acute and delayed

Ethyleneimine is classified as extremely toxic with a probable oral lethal dose of 5-50 mg/kg which is approximately 7 drops to 1 teaspoonful for a 70 kg (150 lb.) person. Ethyleneimine gives inadequate warning when over-exposure is by inhalation or skin absorption. It is a severe blistering agent, causing third degree chemical burns of the skin. Also, it has a corrosive effect on mucous membranes and may cause scarring of the esophagus. It is corrosive to eye tissue and may cause permanent corneal opacity and conjunctival scarring. Severe exposure may result in overwhelming pulmonary edema. Renal damage has been described. Hemorrhagic congestion of all internal organs has been observed. (EPA, 1998)

Indication of immediate medical attention and special treatment needed, if necessary

Basic treatment: Establish a patent airway. Suction if necessary. Watch for signs of respiratory insufficiency and assist ventilations if necessary. Administer oxygen by nonrebreather mask at 10 to 15 L/min. Monitor for pulmonary edema and treat if necessary .

Monitor for shock and treat if necessary . Anticipate seizures and treat if necessary . For eye contamination, flush eyes immediately with water. Irrigate each eye continuously with normal saline during transport . Do not use emetics. For ingestion, rinse mouth and administer 5 mg/kg up to 200 ml of water for dilution if the patent can swallow, has a strong gag reflex, and does not drool. Administer activated charcoal . Cover skin burns with dry sterile dressings after decontamination . /Organic bases/Amines and related compounds/

SECTION 5: Firefighting measures

Suitable extinguishing media

Use dry chemical, "alcohol resistant" foam, carbon dioxide, or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers cool. Approach fire from upwind to avoid hazardous vapors & toxic decomp products. Explosive decomp may occur under fire conditions. Fight fire from protected location or maximum possible distance.

Specific hazards arising from the chemical

Irritating vapors are generated when heated. Vapor is heavier than air and may travel a considerable distance to a source of ignition and flash back. May polymerize in fires with evolution of heat and container rupture. Runoff to sewer may create fire or explosion hazard. Ethyleneimine vapors are not inhibited and may form polymers in vents or flame arresters, resulting in stopping of the vents. Toxic oxides of nitrogen are produced during combustion. Upon treatment with sodium hypochlorite, it gives off the explosive compound 1-chloroazidine. Avoid acids, sodium hypochlorite. If heated under pressure, instability may result. Hazardous polymerization may occur. Avoid contact with silver or aluminum. Explosive polymerization may occur upon contact with acids. Polymerization is catalyzed by carbon dioxide. (EPA, 1998)

Special protective actions for fire-fighters

Use water in large amounts, alcohol-resistant foam, powder. NO carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Environmental precautions

Evacuate danger area! Consult an expert! Personal protection: complete protective clothing including self-contained breathing apparatus. Remove all ignition sources. Do NOT let this chemical enter the environment. Collect leaking and spilled liquid in sealable containers as far as possible. Absorb remaining liquid in sand or inert absorbent. Then store and dispose of according to local regulations.

Methods and materials for containment and cleaning up

Cover with a 9:1 mixture of sand and soda ash. After mixing, transfer into a paper carton.

SECTION 7: Handling and storage

Precautions for safe handling

NO open flames, NO sparks and NO smoking. NO contact with acids. Closed system, ventilation, explosion-proof electrical equipment and lighting. Do NOT use compressed air for filling, discharging, or handling. Use non-sparking handtools. Handling in a well ventilated place. Wear suitable protective clothing. Avoid contact with skin and eyes. Avoid formation of dust and aerosols. Use non-sparking tools. Prevent fire caused by electrostatic discharge steam.

Conditions for safe storage, including any incompatibilities

Fireproof. Separated from acids, oxidants and food and feedstuffs. Dry. Store only if stabilized.Can be stored for some time over a few pellets of sodium hydroxide. In a closed container

SECTION 8: Exposure controls/personal protection

Control parameters

Occupational Exposure limit values

TLV: 0.05 ppm as TWA; 0.1 ppm as STEL; (skin); A3 (confirmed animal carcinogen with unknown relevance to humans).MAK: skin absorption (H); carcinogen category: 2; germ cell mutagen group: 2

Biological limit values

no data available

Appropriate engineering controls

Ensure adequate ventilation. Handle in accordance with good industrial hygiene and safety practice. Set up emergency exits and the risk-elimination area.

Individual protection measures, such as personal protective equipment (PPE)

Eye/face protection

Wear face shield or eye protection in combination with breathing protection.

Skin protection

Protective gloves. Protective clothing.

Respiratory protection

Use ventilation, local exhaust or breathing protection.

Thermal hazards

no data available

SECTION 9: Physical and chemical properties and safety characteristics

Physical state:	Liquid.
Colour:	Colorless.
Odour:	Pungent, ammonia-like odor
Melting point/freezing point:	-71.5 °C.
Boiling point or initial boiling point and boiling range:	55 - 56 °C. Atm. press.:1 013.25 hPa.
Flammability:	Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.
Lower and upper explosion limit/flammability limit:	Lower flammable limit: 3.3% by volume; Upper flammable limit: 54.8% by volume
Flash point:	-11 °C. Atm. press.:1 013.25 hPa.

Auto-ignition temperature:	325 °C. Atm. press.:1 002 - 1 004 mBar.
Decomposition temperature:	no data available
pH:	Strongly alkaline
Kinematic viscosity:	dynamic viscosity (in mPa s) = 0.418. Temperature:25.0°C.
Solubility:	Miscible (NIOSH, 2016)
Partition coefficient n-octanol/water:	-2.95. Temperature:25 °C. Remarks:LogD.;-2.68. Temperature:25 °C. Remarks:LogD.;-1.16. Temperature:25 °C. Remarks:LogD.
Vapour pressure:	284 hPa. Temperature:25 °C.
Density and/or relative density:	0.83. Temperature:24 °C.
Relative vapour density:	1.48 (EPA, 1998) (Relative to Air)
Particle characteristics:	no data available

SECTION 10: Stability and reactivity

Reactivity

100 ppm; NIOSH considers ethyleneimine to be a potential occupational carcinogen.
The substance may polymerize under the influence of acids and oxidizing materials. This generates fire or explosion hazard. On combustion, forms toxic and corrosive fumes including nitrogen oxides. The substance is a medium strong base.

Chemical stability

no data available

Possibility of hazardous reactions

The vapour is heavier than air and may travel along the ground; distant ignition possible. The vapour mixes well with air, explosive mixtures are easily formed.ETHYLENEIMINE vapors are not inhibited and may form polymers in vents or flame arresters,

resulting in stopping of the vents. Produces toxic oxides of nitrogen during combustion. Reacts with sodium hypochlorite and other chlorinating agents to give the explosive compound 1-chloroazidine. Decomposes if heated under pressure. or else hazardous polymerization may occur. Incompatible with silver or aluminum, which induce polymerization May polymerize explosively upon contact with acids. Polymerization is catalyzed by carbon dioxide [EPA, 1998].

Conditions to avoid

no data available

Incompatible materials

Aziridine/ gives the explosive 1-chloroazidine on treatment with /chlorinating agents/ eg sodium hypochlorite solution.

Hazardous decomposition products

When heated to decomposition it emits acrid smoke and irritating fumes.

SECTION 11: Toxicological information

Acute toxicity

Oral: LD50 - rat (male/female) - 4.814 mg/kg bw. Remarks:Calculated using the denisty of 0.83 g/cm3, original specification: 5.8 µL/kg b.w.

Inhalation: LC50 - rat - > 1.8 mg/L.

Dermal: LD50 - rat (male/female) - ca. 12.45 mg/kg bw.

Skin corrosion/irritation

no data available

Serious eye damage/irritation

no data available

Respiratory or skin sensitization

no data available

Germ cell mutagenicity

no data available

Carcinogenicity

Evaluation: No epidemiological data relevant to the carcinogenicity of aziridine were available. There is limited evidence in experimental animals for the carcinogenicity of aziridine. Overall Evaluation: Aziridine is possibly carcinogenic to humans (Group 2B). In making the overall evaluation, the Working Group took into consideration that aziridine is a direct acting alkylating agent which is mutagenic in a wide range of test systems and forms DNA adducts that are promutagenic.

Reproductive toxicity

No information is available on the reproductive or developmental effects of ethyleneimine in humans or animals.

STOT-single exposure

The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. Inhalation of the vapour may cause lung oedema. See Notes. The substance may cause effects on the central nervous system, kidneys and liver. Exposure far above the OEL could cause death. The effects may be delayed.

STOT-repeated exposure

Repeated or prolonged contact with skin may cause dermatitis. Repeated or prolonged contact may cause skin sensitization. This substance is possibly carcinogenic to humans. May cause heritable genetic damage to human germ cells.

Aspiration hazard

A harmful contamination of the air can be reached very quickly on evaporation of this substance at 20°C.

SECTION 12: Ecological information

Toxicity

Toxicity to fish: LC0 - Leuciscus idus - 1.5 mg/L - 48 h.

Toxicity to daphnia and other aquatic invertebrates: EC0 - Daphnia magna - 26 mg/L - 24 h.

Toxicity to algae: EC50 - Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum) - 8.85 mg/L - 72 h.

Toxicity to microorganisms: EC10 - activated sludge, domestic - < 100 mg/L - 30 min. Remarks:Respiration rate.

Persistence and degradability

no data available

Bioaccumulative potential

An estimated BCF of 3 was calculated for ethyleneimine(SRC), using an estimated log Kow of -0.28(1) and a regression-derived equation(2). According to a classification scheme(3), this BCF suggests the potential for bioconcentration in aquatic organisms is low(SRC).

Mobility in soil

The Koc of ethyleneimine is estimated as 2(SRC), using an assigned value for water solubility of 1X10+6 mg/L (miscible)(1) and a regression-derived equation(2). According to a classification scheme(3), this estimated Koc value suggests that ethyleneimine is expected to have very high mobility in soil. However, the pKa of ethyleneimine is 8.04(4), indicating that this compound will partially exist as a cation the environment and cations generally do adsorb more strongly to soils containing organic carbon and clay than their neutral counterparts(5). Ethyleneimine readily complexes with metal salts(6) which may be present in soil(SRC).

Other adverse effects

no data available

SECTION 13: Disposal considerations

Disposal methods

Product

The material can be disposed of by removal to a licensed chemical destruction plant or by controlled incineration with flue gas scrubbing. Do not contaminate water, foodstuffs, feed or seed by storage or disposal. Do not discharge to sewer systems.

Contaminated packaging

Containers can be triply rinsed (or equivalent) and offered for recycling or reconditioning. Alternatively, the packaging can be punctured to make it unusable for other purposes and then be disposed of in a sanitary landfill. Controlled incineration with flue gas scrubbing is possible for combustible packaging materials.

SECTION 14: Transport information

UN Number

ADR/RID: UN1185 (For reference only, please check.)
IMDG: UN1185 (For reference only, please check.)
IATA: UN1185 (For reference only, please check.)

UN Proper Shipping Name

ADR/RID: ETHYLENEIMINE, STABILIZED (For reference only, please check.)
IMDG: ETHYLENEIMINE, STABILIZED (For reference only, please check.)
IATA: ETHYLENEIMINE, STABILIZED (For reference only, please check.)

Transport hazard class(es)

ADR/RID: 6.1 (For reference only, please check.)
IMDG: 6.1 (For reference only, please check.)
IATA: 6.1 (For reference only, please check.)

Packing group, if applicable

ADR/RID: I (For reference only, please check.)
IMDG: I (For reference only, please check.)
IATA: I (For reference only, please check.)

Environmental hazards

ADR/RID: Yes
IMDG: Yes
IATA: Yes

Special precautions for user

no data available

Transport in bulk according to IMO instruments

no data available

SECTION 15: Regulatory information

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

European Inventory of Existing Commercial Chemical Substances (EINECS)

Listed.

EC Inventory

Listed.

United States Toxic Substances Control Act (TSCA) Inventory

Listed.

China Catalog of Hazardous chemicals 2015

Listed.

New Zealand Inventory of Chemicals (NZIoC)

Listed.

(PICCS)

Listed.

Vietnam National Chemical Inventory

Listed.

IECSC)

Listed.

Korea Existing Chemicals List (KECL)

Listed.

SECTION 16: Other information

Abbreviations and acronyms

CAS: Chemical Abstracts Service

ADR: European Agreement concerning the International Carriage of Dangerous Goods by Road

RID: Regulation concerning the International Carriage of Dangerous Goods by Rail

IMDG: International Maritime Dangerous Goods

IATA: International Air Transportation Association

TWA: Time Weighted Average

STEL: Short term exposure limit

LC50: Lethal Concentration 50%

LD50: Lethal Dose 50%

EC50: Effective Concentration 50%

References

IPCS - The International Chemical Safety Cards (ICSC), website: http://www.ilo.org/dyn/icsc/showcard.home

HSDB - Hazardous Substances Data Bank, website: https://toxnet.nlm.nih.gov/newtoxnet/hsdb.htm

IARC - International Agency for Research on Cancer, website: http://www.iarc.fr/

eChemPortal - The Global Portal to Information on Chemical Substances by OECD, website: http://www.echemportal.org/echemportal/index?pageID=0&request_locale=en

CAMEO Chemicals, website: http://cameochemicals.noaa.gov/search/simple

ChemIDplus, website: http://chem.sis.nlm.nih.gov/chemidplus/chemidlite.jsp

ERG - Emergency Response Guidebook by U.S. Department of Transportation, website: http://www.phmsa.dot.gov/hazmat/library/erg

Germany GESTIS-database on hazard substance, website: http://www.dguv.de/ifa/gestis/gestis-stoffdatenbank/index-2.jsp

ECHA - European Chemicals Agency, website: https://echa.europa.eu/

Other Information

Depending on the degree of exposure, periodic medical examination is indicated. The symptoms of lung oedema often do not become manifest until a few hours have passed and they are aggravated by physical effort. Rest and medical observation are therefore essential. The odour warning when the exposure limit value is exceeded is insufficient. Ethyleneimine vapours are uninhibited and may form polymers in vents or flame arrestors causing stoppage of vents. Do NOT take working clothes home.