SAFETY DATA SHEET

Updated on 26/09/2024

1. Material Identification

Product Name : Cyclohexylamine
Catalog Number : io-2071
CAS Number : 108-91-8
Identified uses : Laboratory chemicals, manufacture of chemical compounds
Company : Ionz

>> R&D Use only

2. Hazards Identification

GHS Classification:

Flammable liquid (category 2)
Acute toxicity, oral (Category 3)
Acute toxicity, dermal (Category 3)
Acute toxicity, inhalation (Category 3)
Specific target organ toxicity, single exposure (Category 1)

Pictogram(s)

GHS Hazard Statements

>> H226 (91.2%): Flammable liquid and vapor [Warning Flammable liquids]

>> H302 (96.1%): Harmful if swallowed [Warning Acute toxicity, oral]

>> H311 (58.3%): Toxic in contact with skin [Danger Acute toxicity, dermal]

>> H312 (41.5%): Harmful in contact with skin [Warning Acute toxicity, dermal]

>> H314 (99.8%): Causes severe skin burns and eye damage [Danger Skin corrosion/irritation]

>> H318 (55.3%): Causes serious eye damage [Danger Serious eye damage/eye irritation]

>> H361 (99.3%): Suspected of damaging fertility or the unborn child [Warning Reproductive toxicity]

>> H412 (43.9%): Harmful to aquatic life with long lasting effects [Hazardous to the aquatic environment, long-term hazard]

Precautionary Statement Codes

>> P203, P210, P233, P240, P241, P242, P243, P260, P262, P264, P264+P265, P270, P273, P280, P301+P317, P301+P330+P331, P302+P352, P302+P361+P354, P303+P361+P353, P304+P340, P305+P354+P338, P316, P317, P318, P321, P330, P361+P364, P362+P364, P363, P370+P378, P403+P235, P405, and P501

NFPA 704 Diamond

NFPA Health Rating

>> 3 - Materials that, under emergency conditions, can cause serious or permanent injury.

NFPA Fire Rating

>> 3 - Liquids and solids that can be ignited under almost all ambient temperature conditions. Materials produce hazardous atmospheres with air under almost all ambient temperatures or, though unaffected by ambient temperatures, are readily ignited under almost all conditions.

NFPA Instability Rating

>> 0 - Materials that in themselves are normally stable, even under fire conditions.

Health Hazards:

>> This is classified as very toxic -- probable oral lethal dose is 50-500 mg/kg or between 1 teaspoon and 1 ounce for a 70 kg (150 lb.) person. It is considered a nerve poison. This is a weak methemoglobin-forming substance. (EPA, 1998)

ERG 2024, Guide 132 (Cyclohexylamine)

>> May cause toxic effects if inhaled or ingested.

>> Contact with substance may cause severe burns to skin and eyes.

>> Fire will produce irritating, corrosive and/or toxic gases.

>> Vapors may cause dizziness or asphyxiation, especially when in closed or confined areas.

>> Runoff from fire control or dilution water may cause environmental contamination.

>> When heated to decomposition, it emits highly toxic fumes. Vapor may travel a considerable distance to source of ignition and flash back. Toxic oxides of nitrogen are produced during combustion. Nitric acid; reacts vigorously with oxiding materials. Stable, avoid physical damage, storage with oxidizing material. (EPA, 1998)

ERG 2024, Guide 132 (Cyclohexylamine)

>> Flammable/combustible material.

>> May be ignited by heat, sparks or flames.

>> Vapors may form explosive mixtures with air.

>> Vapors may travel to source of ignition and flash back.

>> Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks, etc.).

>> Vapor explosion hazard indoors, outdoors or in sewers.

>> Those substances designated with a (P) may polymerize explosively when heated or involved in a fire.

>> Runoff to sewer may create fire or explosion hazard.

>> Containers may explode when heated.

>> Many liquids will float on water.

>> Flammable. Above 28 °C explosive vapour/air mixtures may be formed.

3. Composition/Information On Ingredients

Chemical name : Cyclohexylamine
CAS Number : 108-91-8
Molecular Formula : C6H13N
Molecular Weight : 99.1700 g/mol

4. First Aid Measures

First Aid:

>> Warning: Cyclohexylamine is an alkaline-corrosive agent. Contact with eyes may result in severe damage to the cornea, conjunctiva, and blood vessels. Caution is advised.

>> Signs and Symptoms of Cyclohexylamine Exposure: Acute exposure to cyclohexylamine may result in irritation and burning of the skin, eyes, and mucous membranes. Light-headedness, drowsiness, slurred speech, pupillary dilation, increased salivation, dysphagia (difficulty swallowing), abdominal pain, and spontaneous vomiting may occur. Stridor (high-pitched, noisy respirations), dyspnea (shortness of breath), and pulmonary edema are also common. Apathy and mental confusion may develop, with progression to coma and death.

>> Emergency Life-Support Procedures: Acute exposure to cyclohexylamine exposure may require decontamination and life support for the victims. Emergency personnel should wear protective clothing appropriate to the type and degree of contamination. Air-purifying or supplied-air respiratory equipment should also be worn, as necessary. Rescue vehicles should carry supplies such as plastic sheeting and disposable plastic bags to assist in preventing spread of contamination.

>> Inhalation Exposure:

>> 1. Move victims to fresh air. Emergency personnel should avoid self-exposure to cyclohexylamine.

>> 2. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.

>> 3. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 4. Transport to a health care facility.

>> Dermal/Eye Exposure:

>> 1. Remove victims from exposure. Emergency personnel should avoid self-exposure to cyclohexylamine.

>> 3. Remove contaminated clothing as soon as possible.

>> 4. If eye exposure has occurred, eyes must be flushed with lukewarm water for at least 30 minutes.

>> 5. Wash exposed skin areas for at least 15 minutes with water.

>> 6. Obtain authorization and/or further instructions from the local hospital for administration of an antidote or performance of other invasive procedures.

>> 7. Transport to a health care facility.

>> Ingestion Exposure:

>> 1. Evaluate vital signs including pulse and respiratory rate, and note any trauma. If no pulse is detected, provide CPR. If not breathing, provide artificial respiration. If breathing is labored, administer oxygen or other respiratory support.

>> 2. DO NOT induce vomiting or attempt to neutralize!

>> 4. Activated charcoal is of no value.

>> 5. Give the victims water or milk: children up to 1 year old, 125 mL (4 oz or 1/2 cup); children 1 to 12 years old, 200 mL (6 oz or 3/4 cup); adults, 250 mL (8 oz or 1 cup). Water or milk should be given only if victims are conscious and alert.

>> 6. Transport to a health care facility. (EPA, 1998)

ERG 2024, Guide 132 (Cyclohexylamine)

>> General First Aid:

>> Call 911 or emergency medical service.

>> Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and avoid contamination.

>> Move victim to fresh air if it can be done safely.

>> Administer oxygen if breathing is difficult.

>> If victim is not breathing:

>> DO NOT perform mouth-to-mouth resuscitation; the victim may have ingestedor inhaled the substance.

>> If equipped and pulse detected, wash face and mouth, then give artificial respiration using a proper respiratory medical device (bag-valve mask, pocket mask equipped with a one-way valve or other device).

>> If no pulse detected or no respiratory medical device available, provide continuouscompressions. Conduct a pulse check every two minutes or monitor for any signs of spontaneous respirations.

>> Remove and isolate contaminated clothing and shoes.

>> For minor skin contact, avoid spreading material on unaffected skin.

>> In case of contact with substance, remove immediately by flushing skin or eyes with running water for at least 20 minutes.

>> For severe burns, immediate medical attention is required.

>> Effects of exposure (inhalation, ingestion, or skin contact) to substance may be delayed.

>> Keep victim calm and warm.

>> Keep victim under observation.

>> For further assistance, contact your local Poison Control Center.

>> Note: Basic Life Support (BLS) and Advanced Life Support (ALS) should be done by trained professionals.

>> Specific First Aid:

>> For corrosives, in case of contact, immediately flush skin or eyes with running water for at least 30 minutes. Additional flushing may be required.

>> In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.

>> In Canada, an Emergency Response Assistance Plan (ERAP) may be required for this product. Please consult the shipping paper and/or the "ERAP" section.

First Aid Measures

Inhalation First Aid

>> Fresh air, rest. Half-upright position. Refer for medical attention.

Skin First Aid

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

Eye First Aid

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

Ingestion First Aid

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

5. Fire Fighting Measures

>> VAPORS ARE HEAVIER THAN AIR AND MAY TRAVEL TO A SOURCE OF IGNITION & FLASH BACK.

>> Wear self-contained (positive pressure if available) breathing apparatus and full protective clothing. Use dry chemical, alcohol foam or carbon dioxide; water may be ineffective. Move container from fire area if you can do it without risk. Stay away from ends of tanks. Cool containers that are exposed to flames with water from the side until well after fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tank due to fire. Keep unnecessary people away; isolate hazard area and deny entry. Isolate for one-half mile in all directions if tank car or truck is involved in fire. Stay upwind; keep out of low areas. (EPA, 1998)

>> Use water in large amounts, powder, alcohol-resistant foam, carbon dioxide. In case of fire: keep drums, etc., cool by spraying with water.

6. Accidental Release Measures

Isolation and Evacuation:

Isolation and evacuation measures to take when a large amount of this chemical is accidentally released in an emergency.

>> Excerpt from ERG Guide 132 [Flammable Liquids - Corrosive]:

>> IMMEDIATE PRECAUTIONARY MEASURE: Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

>> SPILL: Increase the immediate precautionary measure distance, in the downwind direction, as necessary.

>> FIRE: If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. (ERG, 2024)

Evacuation: ERG 2024, Guide 132 (Cyclohexylamine)

>> Immediate precautionary measure

>> Isolate spill or leak area for at least 50 meters (150 feet) in all directions.

>> Spill

>> For non-highlighted materials: increase the immediate precautionary measure distance, in the downwind direction, as necessary.

>> Fire

>> If tank, rail tank car or highway tank is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions.

Spillage Disposal:

Methods for containment and safety measures to protect workers dealing with a spillage of this chemical.

>> Evacuate danger area! Personal protection: self-contained breathing apparatus. 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.

Accidental Release Measures

Public Safety: ERG 2024, Guide 132 (Cyclohexylamine)

>> CALL 911. Then call emergency response telephone number on shipping paper. If shipping paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.

>> Keep unauthorized personnel away.

>> Stay upwind, uphill and/or upstream.

>> Ventilate closed spaces before entering, but only if properly trained and equipped.

Spill or Leak: ERG 2024, Guide 132 (Cyclohexylamine)

>> ELIMINATE all ignition sources (no smoking, flares, sparks or flames) from immediate area.

>> All equipment used when handling the product must be grounded.

>> Do not touch or walk through spilled material.

>> Stop leak if you can do it without risk.

>> Prevent entry into waterways, sewers, basements or confined areas.

>> A vapor-suppressing foam may be used to reduce vapors.

>> Absorb with earth, sand or other non-combustible material.

>> For hydrazine, absorb with DRY sand or inert absorbent (vermiculite or absorbent pads).

>> Use clean, non-sparking tools to collect absorbed material.

>> Large Spill

>> Dike far ahead of liquid spill for later disposal.

>> Water spray may reduce vapor, but may not prevent ignition in closed spaces.

7. Handling And Storage

Safe Storage:

>> Fireproof. Separated from acids, oxidants, aluminium, copper, zinc and food and feedstuffs. Well closed.

Storage Conditions:

>> Outside or detached storage is preferred. Avoid oxidizing materials, acid, and sources of halogen. Store in a cool, dry well-ventilated location.

8. Exposure Control/ Personal Protection

REL-TWA (Time Weighted Average)

>> 10 ppm (40 mg/m³)

>> TWA 10 ppm (40 mg/m3)

>> none See Appendix G

>> 10.0 [ppm]

>> 10 ppm as TWA; A4 (not classifiable as a human carcinogen).

TLV-TWA (Time Weighted Average)

>> 10 ppm [1990]

MAK (Maximale Arbeitsplatz Konzentration)

>> 8.2 mg/m

Emergency Response: ERG 2024, Guide 132 (Cyclohexylamine)

>> Some of these materials may react violently with water.

>> Small Fire

>> Dry chemical, CO2, water spray or alcohol-resistant foam.

>> Large Fire

>> Water spray, fog or alcohol-resistant foam.

>> If it can be done safely, move undamaged containers away from the area around the fire.

>> Dike runoff from fire control for later disposal.

>> Do not get water inside containers.

>> Fire Involving Tanks, Rail Tank Cars or Highway Tanks

>> Fight fire from maximum distance or use unmanned master stream devices or monitor nozzles.

>> Cool containers with flooding quantities of water until well after fire is out.

>> Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.

>> ALWAYS stay away from tanks in direct contact with flames.

>> For massive fire, use unmanned master stream devices or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

Inhalation Risk:

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

Effects of Short Term Exposure:

>> The substance is corrosive to the eyes, skin and respiratory tract. Corrosive on ingestion. The substance may cause effects on the central nervous system.

Fire Prevention

>> NO open flames, NO sparks and NO smoking. Above 28 °C use a closed system, ventilation and explosion-proof electrical equipment.

Exposure Prevention

>> AVOID ALL CONTACT! IN ALL CASES CONSULT A DOCTOR!

Inhalation Prevention

>> Use ventilation, local exhaust or breathing protection.

Skin Prevention

>> Protective gloves. Protective clothing.

Eye Prevention

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

Ingestion Prevention

>> Do not eat, drink, or smoke during work.

Exposure Control and Personal Protection

Protective Clothing: ERG 2024, Guide 132 (Cyclohexylamine)

>> Wear positive pressure self-contained breathing apparatus (SCBA).

>> Wear chemical protective clothing that is specifically recommended by the manufacturer when there is NO RISK OF FIRE.

>> Structural firefighters' protective clothing provides thermal protection but only limited chemical protection.

Maximum Allowable Concentration (MAK)

>> 2.0 [ppm]

9. Physical And Chemical Properties

Molecular Weight:

>> 99.17

Exact Mass:

>> 99.104799419

Physical Description:

>> Cyclohexylamine appears as a clear colorless to yellow liquid with an odor of ammonia. Flash point 90 °F. Irritates the eyes and respiratory system. Skin contact may cause burns. Less dense than water. Vapors heavier than air. Toxic oxides of nitrogen produced during combustion.

>> COLOURLESS-TO-YELLOW LIQUID WITH PUNGENT ODOUR.

Color/Form:

>> Colorless or yellow liquid.

Odor:

>> Strong, fishy, amine odor.

Boiling Point:

>> 274.1 °F at 760 mmHg (EPA, 1998)

>> 134.5 °C

Melting Point:

>> 0.1 °F (EPA, 1998)

>> -17.7 °C

Flash Point:

>> 88 °F (EPA, 1998)

>> 28 °C c.c.

Solubility:

>> Very soluble (NTP, 1992)

>> Solubility in water: miscible

Density:

>> 0.8647 at 77 °F (EPA, 1998) - Less dense than water; will float

>> Relative density (water = 1): 0.86

Vapor Density:

>> 3.42 (EPA, 1998) - Heavier than air; will sink (Relative to Air)

>> Relative vapor density (air = 1): 3.42

Vapor Pressure:

>> 11 mmHg (NIOSH, 2024)

>> Vapor pressure, kPa at 20 °C: 1.4

LogP:

>> log Kow = 1.49

>> 1.4

Autoignition Temperature:

>> 560 °F (USCG, 1999)

>> 293 °C

Decomposition:

>> When heated to decomposition it emits toxic fumes of NOx /nitrogen oxides/.

Viscosity:

>> 2.10 Pa*s at 20 °C

pH:

pH is an expression of hydrogen ion concentration in water. Specifically, pH is the negative logarithm of hydrogen ion (H+) concentration (mol/L) in an aqueous solution. The term is used to indicate basicity or acidity of a solution on a scale of 0 to 14, with pH 7 being neutral.

>> STRONG BASE

Ionization Potential:

>> 8.37 eV

Odor Threshold:

>> Odor Threshold Low: 2.6 [mmHg]

>> Odor Threshold High: 110.0 [mmHg]

>> Odor thresholds from CHEMINFO

Refractive Index:

>> Index of refraction: 1.4565 @ 25 °C/D

Dissociation Constants:

>> pKa = 10.63 (conjugate acid)

10. Stability And Reactivity

>> Highly flammable. Sensitive to air and light. Soluble in water.

>> Highly Flammable

11. Toxicological Information

Evidence for Carcinogenicity:

Evidence that this chemical does or may cause cancer. The information here is collected from various sources by the Hazardous Substances Data Bank (HSDB).

>> A4: Not classifiable as a human carcinogen.

Exposure Routes:

>> The substance can be absorbed into the body by inhalation, through the skin and by ingestion.

>> inhalation, skin absorption, ingestion, skin and/or eye contact

Inhalation Exposure

>> Burning sensation. Cough. Laboured breathing. Nausea. Vomiting.

Skin Exposure

>> Redness. Pain. Skin burns.

Eye Exposure

>> Redness. Pain. Severe deep burns.

Ingestion Exposure

>> Dizziness. Abdominal cramps. Burning sensation. Vomiting. Abdominal pain. Shock or collapse. Nausea.

>> irritation eyes, skin, mucous membrane, respiratory system; eye, skin burns; skin sensitization; cough, pulmonary edema; drowsiness, dizziness; diarrhea, nausea, vomiting

Target Organs:

Organs that are affected by exposure to this chemical. Information in this section reflects human data unless otherwise noted.

>> Reproductive

>> Eyes, skin, respiratory system, central nervous system

Adverse Effects:

An adverse effect is an undesired harmful effect resulting from a medical treatment or other intervention.

>> Methemoglobinemia - The presence of increased methemoglobin in the blood; the compound is classified as secondary toxic effect

>> Dermatotoxin - Skin burns.

>> Skin Sensitizer - An agent that can induce an allergic reaction in the skin.

>> Toxic Pneumonitis - Inflammation of the lungs induced by inhalation of metal fumes or toxic gases and vapors.

Toxicity Data:

>> LC50 (rat) = 7,500 mg/m3

Antidote and Emergency Treatment:

>> 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 mL/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/

Human Toxicity Excerpts:

>> CYCLOHEXYLAMINE IS WEAK METHEMOGLOBIN-FORMING SUBSTANCE.

Non-Human Toxicity Excerpts:

>> CNS DEPRESSION. /FROM TABLE/

Non-Human Toxicity Values:

>> LD50 Rat oral 156 mg/kg

TSCA Test Submissions:

Under the Toxic Substances Control Act (TSCA), EPA has broad authority to issue regulations designed to require manufacturers (including importers) or processors to test chemical substances and mixtures for health and environmental effects. This section provides information on test reports submitted for this chemical under TSCA.

>> Cyclohexylamine (CAS # 108-91-8) was evaluated for acute dermal toxicity in solitary male and female New Zealand albino rabbits alternately administered single undiluted dermal applications of 398, 631, 1000, and 1580 mg/kg bodyweight for 24 hours. Clinical signs were observed at all dose levels and included reduced appetite and activity, increasing weakness and collapse. The 1000 mg/kg male and the 1580 mg/kg female both died within 16 hours of treatment, while solitary male and female rabbits of the 398 and 631 mg/kg doses, respectively, saw resolution of all pharmacotoxic signs within 5-7 days. Upon necropsy, the high dose study lethalities were found with lung and liver hyperemia, dark spleen and kidneys, and enlarged gall bladder, while the viscera of the male and female surviving 14-day post-treatment observation appeared normal.

12. Ecological Information

Resident Soil (mg/kg)

>> 1.60e+04

Industrial Soil (mg/kg)

>> 2.30e+05

Tapwater (ug/L)

>> 3.80e+03

MCL (ug/L)

>> 2.00e+02

Risk-based SSL (mg/kg)

>> 1.00e+00

Chronic Oral Reference Dose (mg/kg-day)

>> 2.00e-01

Volatile

>> Volatile

Mutagen

>> Mutagen

Fraction of Contaminant Absorbed in Gastrointestinal Tract

>> 1

Soil Saturation Concentration (mg/kg)

>> 2.93e+05

ICSC Environmental Data:

>> The substance is harmful to aquatic organisms.

13. Disposal Considerations

Spillage Disposal

>> Evacuate danger area! Personal protection: self-contained breathing apparatus. 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.

Disposal Methods

>> SRP: At the time of review, criteria for land treatment or burial (sanitary landfill) disposal practices are subject to significant revision. Prior to implementing land disposal of waste residue (including waste sludge), consult with environmental regulatory agencies for guidance on acceptable disposal practices.

14. Transport Information

DOT

Cyclohexylamine
8
UN Pack Group: II

IATA

Cyclohexylamine
8, 3
UN Pack Group: II

15. Regulatory Information

DHS Chemicals of Interest (COI):

This section provides the Department of Homeland Security (DHS) Chemicals of Interest (COI) and related information (Ref: 6 eCFR part 27 - https://www.ecfr.gov/current/title-6/chapter-I/part-27).

Chemicals of Interest(COI)

>> Cyclohexylamine

Release: Minimum Concentration (%)

>> 1

Release: Screening Threshold Quantities (in pounds)

>> 15000

Security Issue: Release - Toxic

>> Toxic chemical that can be released at a facility.

Regulatory Information

The Australian Inventory of Industrial Chemicals

>> Chemical: Cyclohexanamine

REACH Registered Substance

>> Status: Active Update: 24-08-2022 https://echa.europa.eu/registration-dossier/-/registered-dossier/13348

>> Status: Active Update: 21-06-2018 https://echa.europa.eu/registration-dossier/-/registered-dossier/26099

New Zealand EPA Inventory of Chemical Status

>> Cyclohexanamine: HSNO Approval: HSR001532 Approved with controls

16. Other Information

Other Safety Information

Chemical Assessment

>> IMAP assessments - Cyclohexanamine: Human health tier II assessment

>> IMAP assessments - Cyclohexanamine: Environment tier I assessment

"The information provided is believed to be accurate but is not comprehensive and should be used as a reference. It reflects our current knowledge and is intended for safety guidance related to the product. This document does not constitute a warranty of the product's properties. Ionz is not responsible for any damages resulting from handling or contact with the product incorrectly."