

Material Safety Data Sheet

Cyclohexylamine

SECTION 1: CHEMICAL PRODUCT & COMPANY IDENTIFICATION



In the event of a medical or chemical emergency contact

North America 1-800-255-3924 or Worldwide Intl. + 01- 813-248-0585

Product: Cyclohexylamine
Trade Name / synonyms: Aminocyclohexane; Aminohexahydrobenzene; Cyclohexanamine;
Hexahydroaniline; Hexahydrobenzenamine; CHA
CAS Number: 108-91-8
Formula: $C_6H_{13}N$
Chemical Name: Cyclohexylamine
Producer / Supplier: TransChem, Inc.
5963 La Place Court, suite 104
Carlsbad, CA 92008
Phone: (760) 431-6310

SECTION 2: HAZARDS IDENTIFICATION

Emergency Overview

DANGER! Causes skin, eye and digestive tract burns. Flammable liquid and vapor causes respiratory tract irritation. Harmful if inhaled, absorbed through skin or swallowed. Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Health Rating: 3
Flammability Rating: 3
Reactivity: 0
Product Description
Appearance: Clear Liquid
Odor: Ammonia-like odor.

Target Organ Effects

Overexposure (prolonged or repeated exposure)

May cause injury to eyes, irritation of the respiratory tract. Local irritation at the site of exposure and skin damage.

Medical conditions which may be aggravated by exposure

Significant exposure to this chemical may adversely affect people with acute or chronic diseases of the respiratory tract, skin, eyes and cardiovascular system.

Potential Health Effects

Routes of Exposure

Skin, eyes, inhalation, ingestion

Inhalation

Causes respiratory tract irritation. Harmful if inhaled. Symptoms of exposure may include: Nasal discharge, hoarseness, coughing, chest pain and breathing difficulty. Nausea, headache and / or dizziness. Accumulation of fluid in the lungs (pulmonary edema); symptoms can be delayed for several hours.

Ingestion

Causes digestive tract burns. Harmful if swallowed. Symptoms of exposure may include: Inflammation of mouth, throat, esophagus and/or stomach. Nausea, vomiting, loss of appetite, gastrointestinal irritation and/or diarrhea.

Skin Contact

Causes skin burns. Harmful if absorbed through skin. Symptoms of exposure may include: Redness or discoloration, swelling, itching, burning or blistering of skin.

Eye Contact

Exposure to liquid causes severe eye burns, damage irreversible. Exposure to vapors causes eye irritation. Symptoms of exposure may include: eye irritation, burning sensation, pain, watering, and/or change of vision. Transient visual disturbances characterized by mildly blurred vision and a blue-gray discoloration of sight. This effect is commonly referred to as blue haze, or halo vision, with halo vision getting its name from the appearance of halo when looking at light sources. These effects are due to mild corneal irritation and edema and normally disappear several hours after exposure.

Reproductive

May cause adverse reproductive effects based on animal data.

Mutagenic

Does not show mutagenic potential in Ames test. Does not show mutagenic potential in most in vitro tests.

Teratogenic

No evidence of birth defects

SECTION 3: COMPOSITION / INFORMATION ON INGREDIENT

Component	CAS No.	%	OSHA Hazard
Cyclohexylamine	108-91-8	99.5	Yes

SECTION 4: FIRST AID MEASURES

Eye Contact

Immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses, if worn. Get medical attention immediately.

Skin Contact

Initial emergency treatment should consist of washing with large amounts of 5% acetic acid (aqueous vinegar) alternating with soap and water, while removing contaminated clothing and shoes. Continue regime for at

least 15 minutes, although the acetic acid may be discontinued once the stickiness is gone. In all cases, large amounts of plain water rinsing for 5 minutes is the final step. If 5% acetic acid is not immediately available, wash with plenty of water until 5% acetic acid can be obtained. Get medical attention immediately. Wash clothing before reuse. Destroy contaminated shoes.

Inhalation

Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Ingestion

DO NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately. Call a physician

Note to Physician

Observe for latent pulmonary edema. Treat as an alkaline substance (similar to ammonia).

SECTION 5: FIRE-FIGHTING MEASURES

Flash Point:	28°C (83 °F)
Auto-ignition:	293.6 °C (560 °F)
Flammable Limits in Air, % by volume	Upper: 8.2%
	Lower: 0.66%

Fire Extinguishing Media

Use alcohol type aqueous film forming foam for large fires. Use CO2 or dry chemical for small fires.

Products of Combustion

In the presence of sufficient oxygen, combustion may produce oxides of nitrogen and carbon dioxide. Nitrogen oxides can react with water to produce nitric acid. Combustion under oxygen starved conditions may produce numerous toxic products including carbon monoxide, cyanides and nitriles.

Fire-Fighting Instruction

Water may be ineffective but should be used to cool fire-exposed structures and vessels. Use water spray for large fires. Water spray can be used to reduce the intensity of flames and to dilute spills to a non-flammable mixture. Keep personnel removed from and upwind of fire. If potential for exposure to vapors or products of combustion exists, wear full fire-fighting turnout gear and NIOSH approved self-contained breathing apparatus. Oxidizing chemicals may accelerate the burning rate in a fire situation. Vapor is heavier than air and can travel considerable distance to a source of ignition and flashback.

Environmental Concerns

Water run-off and vapor cloud may be corrosive. Dike and collect water used to fight fire for neutralization before release. Thoroughly decontaminate bunker gear and other fire-fighting equipment before re-use.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Eliminate ignition sources. See Section 8 for appropriate personal protective equipment. Contain spill with dikes of soil or nonflammable absorbent to minimize contaminated area. If fire potential exists, blanket spill with alcohol type aqueous film-forming foam or use water fog stream to disperse vapors. Avoid run-off into storm sewers and ditches leading to waterways. If required/ notify state and local authorities. Place leaking containers in well-ventilated area. Clean up small spills by using a nonflammable absorbent or flushing sparingly with water. Contain larger spills with nonflammable diking or absorbent. Clean up by vacuuming or sweeping.

Within the United States, call the National Response Center (800-424-8802) and appropriate state and local authorities if the quantity released over 24 hours is equal to or greater than the reportable quantity listed below: 10,000 lbs. of the material as is, based on a Reportable Quantity of 10,000 lbs for cyclohexylamine.

Keep unnecessary people away; isolate hazard area and deny entry. Stay upwind; keep out of low areas. Isolate for 800 meters or 0.5 miles in all directions if tank, rail car, or tank truck is involved in fire. Evacuate downwind areas as conditions warrant to prevent exposure and to allow vapors or fumes to dissipate. Spills may expose downwind areas to toxic or flammable concentrations over considerable distances in some cases.

SECTION 7: HANDLING & STORAGE

Handling

Use with adequate ventilation. Keep containers closed when not in use. Always open containers slowly to allow any excess pressure to vent. Avoid breathing vapor. Avoid contact with eyes, skin or clothing. Wash thoroughly with soap and water after handling. Decontaminate soiled clothing thoroughly before re-use. Destroy contaminated leather clothing.

This product may generate a static charge. Ground/bond equipment when transferring material to prevent static accumulation. Electrical equipment and circuits in all storage and handling must conform to requirements of National Electric Code (Article 500 and 501) for hazardous location.

Storage

Keep all containers tightly closed when not in use. Store out of direct sunlight and on an impermeable floor. Do not store with incompatible materials. See Section 10. Stability and Reactivity.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls

General or dilution ventilation is frequently insufficient as the sole means of controlling employee exposure. Local ventilation is usually preferred. Explosion-proof equipment (for example fans, switches, and grounded ducts) should be used in mechanical ventilation systems.

Protective Equipment

A safety shower and eyebath should be readily available. 5% Acetic acid solution (aqueous vinegar) should be readily available for first aid treatment of splashes to the skin.

Skin Protection

Wear impervious clothing and gloves to prevent contact. Butyl rubber is recommended. Other protective material may be used, depending on the situation, if adequate degradation and permeation data is available. If other chemicals are used in conjunction with this chemical, material selection should be based on protection for all chemicals present.

Eye Protection

Wear chemical goggles when there is a reasonable chance of eye contact. In addition to goggles, wear a face shield if there is a reasonable chance for splash to the face.

Respirators

Based on workplace contaminant level and working limits of the respirator, use a respirator approved by NIOSH. The following is the minimum recommended equipment for an occupational exposure level. To estimate an occupational exposure level see Section 3, Section 8 and Section 11.

For concentrations > 1 and < 100 times the occupational exposure level: Use Type C full face piece supplied-air respirator operated in positive-pressure or continuous-flow mode

For concentrations > 100 times the occupational exposure level or greater than the IDLH level or unknown concentrations (such as in emergencies): Use self-contained breathing apparatus with full face piece in positive-pressure mode or Type C positive-pressure full face piece supplied-air respirator with an auxiliary positive-pressure self-contained breathing apparatus escape system.

For Escape: Use self-contained breathing apparatus with full face piece or any respirator specially approved for escapes

Exposure Guidelines

Component	%	ACGIH TWA	ACGIH STEL	OSHA TWA	OSHA STEL	OSHA STEL	OSHA CEILING
Cyclohexylamine	99.5	10 ppm	-	-	40 mg/ra3 10 ppm	-	-

Component	1990 NIOSH IDLH (Recognized by OSHA)	1994 NIOSH IDLH
Cyclohexylamine 108-91-8	---	---

SECTION 9: PHYSICAL & CHEMICAL PROPERTIES

Appearance	: Clear Liquid.
Odor	: Ammonia-like Odor
Vapor Pressure	: 11 mm/Hg
Vapor Density (Air=1 @20°C)	: 3.42
Boiling Point (760 mm/HgA)	: 134.5 °C (274.1 °F)
Melting Point	: -17.7 °C (0.1 °F)
Solubility in Water @ 20 oC	: 100%
Specific Gravity	: 0.864 @ 20 °C
Molecular weight	: 99.19

SECTION 10: STABILITY & REACTIVITY

Stability	Stable
Hazardous Combustion	Thermal Decomposition products may include oxides of carbon. In the presence of sufficient oxygen, combustion may produce oxides of nitrogen and carbon dioxide. Nitrogen oxides can react with water to produce nitric acid. Combustion under oxygen starved conditions may produce numerous toxic products including carbon monoxide, cyanides nitriles.
Hazardous Polymerization	Hazardous Polymerization will not occur.
Incompatibility	Keep away from acids, oxidizing agents, nitrites, copper, copper alloys, or cellulose nitrate.

SECTION 11: TOXICOLOGICAL INFORMATION

Component toxicological information

Component: CYCLOHEXYLAMINE

Acute Exposure

Oral LD50: 156-710 mg/kg (rats); Moderately toxic

Dermal LD50: 277-320 mg/kg (rabbits); corrosive to rabbit skin. Allergic skin reactions were not produced in the Mouse Ear Swelling screen.

Inhalation LC50: 2.3 mg/l (rats, 4hrs.); moderately toxic.

Eye: Corrosive to rabbit eyes.

Mutagenicity: Cyclohexylamine has yielded some positive, but mainly negative in-vitro and in-vivo mutagenicity test results.

Carcinogenicity: Not carcinogenic in chronic feeding studies with rats and mice.

Reproduction: Not teratogenic in rats, mice, monkeys dosed orally. High oral doses have resulted in embryo and fetal toxicity and fertility problems in mice, probably as a secondary effect from reduced body weights in the mothers. Testicular effects (reduction in weight and spermatogenesis) were observed in rats and dogs exposed orally to high doses (200-300 mg/kg/day). Similar effects were not seen in mice at doses up to 300 mg/kg/day or in rats at 100 mg/kg/day or lower.

SECTION 12: ECOLOGICAL INFORMATION

Component Ecological information

Component: CYCLOHEXYLAMINE

Eco-toxicity: Cyclohexylamine exhibits slight acute toxicity to most aquatic species, but high toxicity to some types of Algae.

Fish, Rainbow Trout (<i>Oncorhynchus mykiss</i>)	96-hr. LC50 = 44-90 ppm.
Fish, Zebrafish (<i>Brachydanio rerio</i>)	96-hr. LC50 = 470 ppm.
Fish, Golden Orfe (<i>Leuciscus idus</i>)	48-hr. LC50 = 59-195 ppm.
Fish, Medaka, High-eyes (<i>Oryzias latipes</i>)	48-hr. LC50 = 54 ppm.
Crustacean, Water Flea (<i>Daphnia magna</i>)	24-hr. EC50 = 49-80 ppm.
Algae (<i>Microcystis aeruginosa</i>)	8-day TT = 0.02 ppm.
Algae (<i>Anacystis aeruginosa</i>)	8-day TT = 0.02 ppm
Algae (<i>Scenedesmus quadricauda</i>)	8-day TT = 0.3-0.5 ppm.
Algae (<i>Scenedesmus quadricauda</i>)	7-day TT = 0.51 ppm.
Algae (<i>Selenastrum capricornutum</i>)	96-hr. EC50 = 20 ppm.
Protozoa (<i>Entosiphon sulcatum</i>)	72-hr. TT = 0.70 ppm.
Protozoa (<i>Chiloraonas Paramecium</i>)	48-hr. TT > 400 ppm.

Protozoa	(Tetrahymena pyriformis)	24-hr. EC50 = 210 ppm.
Protozoa	(Uronema parduczi)	20-hr. TT > 200 ppm.
Bacteria (Escherichia coli)		24-hr. ECO = 500 ppm.
Bacteria (Pseudomonas fluorescens)		24-hr. EC50 = 500 ppm.
Bacteria (Pseudomonas putida)		18-hr. ECO = 1000 ppm.
Bacteria (Pseudomonas putida)		16-hr. TT = 420 ppm.

TT - Toxicity Threshold for cell multiplication (growth) inhibition.

Environmental Fate

Degradation:	In several tests, Cyclohexylamine was "readily biodegradable" (60 to 94% within 21 days) when incubated under aerobic conditions with activated sewage sludge under a variety of conditions. The ratio BOD5/COD was determined to be 0.48. In the atmosphere, Cyclohexylamine is expected to have a half-life of 1.82 days.
Bioaccumulation:	The measured value of the log n-octanol/water partition coefficient was 1.2, as determined using OECD Guideline 107 (flask shaking method). The calculated value of the log n-octanol/water partition coefficient was 1.49. This indicates low potential for bioaccumulation.

SECTION 13: DISPOSAL INFORMATION

Dispose of spilled material in accordance with state and local regulations for hazardous waste. Recommended methods are incineration or biological treatment at a federally or state-permitted disposal facility. Note that this information applies to the material as manufactured; processing, use, or contamination may make this information inappropriate, inaccurate, or incomplete.

Note that this handling and disposal information may also apply to empty containers, liners and rinsate. State or local regulations or restrictions are complex and may differ from federal regulations.

This information is intended as an aid to proper handling and disposal; the final responsibility for handling and disposal is with the owner of the waste. See Section 9 - Physical and Chemical Properties.

EPA Hazardous Waste Code(s): D001, D018

SECTION: 14: TRANSPORTATION INFORMATION

DOT

UN Number	: UN2357
Proper Shipping Name	: Cyclohexylamine
Hazard Class	: 8
Packaging Group	: II
Note	: Corrosive Liquid

ICAO/IATA

IATA UN Number	: UN2357
Proper Shipping Name	: Cyclohexylamine

Hazard Class : 8
Packaging Group : II

IMDG

International Marine UN : UN2357
Proper Shipping Name : Cyclohexylamine
Hazard Class : 8
Subsidiary Hazard : 3
Packaging Group : II
Flash Point (test method) : 28.3 °C (83°F)

SECTION 15: REGULATORY INFORMATION

U.S. STATE REGULATIONS

Chemicals associated with the product which are subject to the state right-to-know regulations are listed along with the applicable state(s):

CYCLOHEXYLAMINE 108-91-8 99.5

Pennsylvania : Listed
New York : Listed
New Jersey : Listed
Illinois : Listed
Massachusetts : Listed
Rhode Island : Listed

US FEDERAL REGULATIONS

TSCA Inventory: We certify that all components are either on the TSCA inventory or qualify for an exemption.

Environmental Regulations:

CYCLOHEXYLAMINE 108-91-8 99.5

SARA EHS : Listed

SARA 311

Acute Health : Yes
Chronic Health : No
Fire : Yes
Sudden release of pressure : No
Reactive : No

SECTION 16: ADDITIONAL INFORMATION

Hazard Ratings:	This information is intended solely for the use of individuals trained in the NFPA and/or HMIS systems.
NFPA:	Health: 3 Flammability: 3 Reactivity: 0
HMIS:	Health: 3 Flammability: 3 Reactivity: 0
Note:	The information contained herein is accurate to the best of our knowledge. We do not suggest or guarantee that any hazards listed herein are the only ones which exist. This information is subject to revision as additional knowledge and experience is gained.

Attention:

Refer to our Technical bulletin and MSDS regarding, safety, usage, application, and hazards. Consult your supervisor for additional information on procedures and disposal of this product. Be aware that local regulations and policies change. Please consult your state, county, or city regulatory authorities for directions on area requirements.