

CYCLOHEXYLAMINE

GHS Safety Data Sheet

Version No:3

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Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME

CYCLOHEXYLAMINE

OTHER NAMES

C6-H13-N, aminocyclohexane, aminohexahydrobenzene, CHA, cyclohexanamine, hexahydrobenzenamine

PROPER SHIPPING NAME

CYCLOHEXYLAMINE

PRODUCT USE

Used for organic synthesis, the manufacture of insecticides, plasticisers, corrosion inhibitors, rubber chemicals, dyestuffs, emulsifying agents, dry cleaning soap, acid gas absorbents.

SUPPLIER

Company: S D FINE- CHEM LIMITED

Address:

315- 317, T.V. INDUSTRIAL ESTATE,

248, WORLI,

MUMBAI- 400030.INDIA.

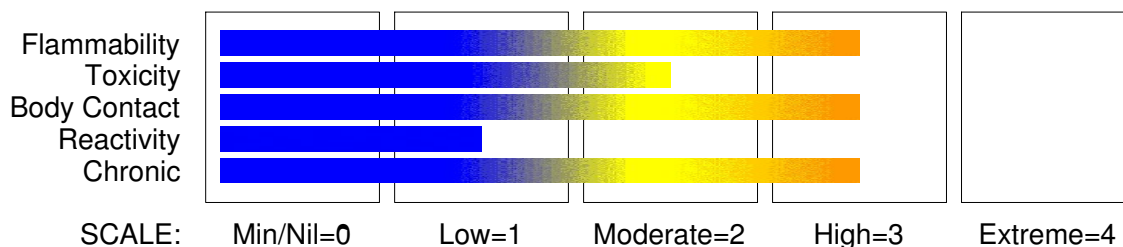
technical@sdfine.com

Telephone: 91- 22- 24959898

Telephone: 91- 22- 24959899

Fax: 91- 22- 24937232

HAZARD RATINGS



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Section 2 - HAZARDS IDENTIFICATION

GHS Classification

Acute Toxicity (Dermal) Category 4
Acute Toxicity (Oral) Category 2
Flammable Liquid Category 2
Metal Corrosion Category 1
Reproductive Toxicity Category 1B
Skin Corrosion/Irritation Category 1B



EMERGENCY OVERVIEW

HAZARD

DANGER

Determined by using GHS criteria:

H225 H300 H312 H360 H290 H314

Highly flammable liquid and vapour

Fatal if swallowed

Harmful in contact with skin

May damage fertility

May be corrosive to metals

Causes severe skin burns and eye damage

PRECAUTIONARY STATEMENTS

Prevention

Ground/bond container and receiving equipment.

Wear protective gloves/clothing and eye/face protection.

Use only non-sparking tools.

Obtain special instructions before use.

Do not breathe dust or mist.

Wash thoroughly after handling.

Do not eat, drink or smoke when using this product.

Wash hands thoroughly after handling.

Use personal protective equipment as required.

Wear protective gloves and eye/face protection.

Do not handle until all safety precautions have been read and understood.

Keep container tightly closed.

Use explosion-proof electrical/ventilating/lighting/equipment

Take precautionary measures against static discharge

Wear protective gloves/clothing

Keep away from heat/sparks/open flame - No smoking.

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Section 2 - HAZARDS IDENTIFICATION

Response

IF ON SKIN: Gently wash with plenty of soap and water.
Immediately call a POISON CENTER or doctor/physician.
IF INHALED: Remove to fresh air and keep at rest in a position comfortable for breathing.
IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
If exposed or concerned: Get medical attention advice.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
Wash contaminated clothing before reuse.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Specific treatment: refer to Label or MSDS.
Absorb spillage to prevent material damage.
In case of fire, use alcohol-type foam for extinction.
If on skin or hair: remove/take off immediately all contaminated clothing. Rinse with water/shower.
Call a POISON CENTER or doctor/physician if you feel unwell.

Storage

Store locked up.
Store in a corrosive resistant container with a resistant liner.

Disposal

Dispose of contents and container in accordance with relevant legislation.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

NAME	CAS RN	%
cyclohexylamine	108-91-8	> 98%

Section 4 - FIRST AID MEASURES

SWALLOWED

For advice, contact a Poisons Information Centre or a doctor.

- If swallowed do NOT induce vomiting.
- If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
- Observe the patient carefully.
- Never give liquid to a person showing signs of being sleepy or with reduced awareness; i.e. becoming unconscious
- Give water to rinse out mouth, then provide liquid slowly and as much as casualty can comfortably drink.
- Seek medical advice.

EYE

If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.

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Section 4 - FIRST AID MEASURES

- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

If skin or hair contact occurs:

- Immediately flush body and clothes with large amounts of water, using safety shower if available.
- Quickly remove all contaminated clothing, including footwear.
- Wash skin and hair with running water. Continue flushing with water until advised to stop by the Poisons Information Centre.
- Transport to hospital, or doctor.

INHALED

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor.

NOTES TO PHYSICIAN

For acute or short-term repeated exposures to highly alkaline materials:

- Respiratory stress is uncommon but present occasionally because of soft tissue edema.
 - Unless endotracheal intubation can be accomplished under direct vision, cricothyroidotomy or tracheotomy may be necessary.
 - Oxygen is given as indicated.
 - The presence of shock suggests perforation and mandates an intravenous line and fluid administration.
 - Damage due to alkaline corrosives occurs by liquefaction necrosis whereby the saponification of fats and solubilisation of proteins allow deep penetration into the tissue.
- Alkalis continue to cause damage after exposure.

INGESTION:

- Milk and water are the preferred diluents
- No more than 2 glasses of water should be given to an adult.
- Neutralising agents should never be given since exothermic heat reaction may compound injury.
 - * Catharsis and emesis are absolutely contra-indicated.
 - * Activated charcoal does not absorb alkali.
 - * Gastric lavage should not be used.

Supportive care involves the following:

- Withhold oral feedings initially.
- If endoscopy confirms transmucosal injury start steroids only within the first 48 hours.
- Carefully evaluate the amount of tissue necrosis before assessing the need for surgical intervention.
- Patients should be instructed to seek medical attention whenever they develop difficulty in swallowing (dysphagia).

SKIN AND EYE:

- Injury should be irrigated for 20-30 minutes.
- Eye injuries require saline. [Ellenhorn & Barceloux: Medical Toxicology].

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Section 4 - FIRST AID MEASURES

The material may induce methaemoglobinaemia following exposure.

- Initial attention should be directed at oxygen delivery and assisted ventilation if necessary. Hyperbaric oxygen has not demonstrated substantial benefits.
- Hypotension should respond to Trendelenburg's position and intravenous fluids; otherwise dopamine may be needed.
- Symptomatic patients with methaemoglobin levels over 30% should receive methylene blue. (Cyanosis, alone, is not an indication for treatment). The usual dose is 1-2 mg/kg of a 1% solution (10 mg/ml) IV over 50 minutes; repeat, using the same dose, if symptoms of hypoxia fail to subside within 1 hour.
- Thorough cleansing of the entire contaminated area of the body, including the scalp and nails, is of utmost importance.

BIOLOGICAL EXPOSURE INDEX - BEI

These represent the determinants observed in specimens collected from a healthy worker exposed at the Exposure Standard (ES or TLV):

Determinant	Index	Sampling Time	Comment
1. Methaemoglobin in blood	1.5% of haemoglobin	During or end of shift	B, NS, SQ

B: Background levels occur in specimens collected from subjects NOT exposed

NS: Non-specific determinant; also observed after exposure to other materials

SQ: Semi-quantitative determinant - Interpretation may be ambiguous; should be used as a screening test or confirmatory test.

Section 5 - FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

- Alcohol stable foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- Fight fire from a safe distance, with adequate cover.
- If safe, switch off electrical equipment until vapour fire hazard removed.
- Use water delivered as a fine spray to control fire and cool adjacent area.
- Avoid spraying water onto liquid pools.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.

FIRE/EXPLOSION HAZARD

- Liquid and vapour are highly flammable.
- Severe fire hazard when exposed to heat, flame and/or oxidisers.
- Vapour forms an explosive mixture with air.

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Section 5 - FIRE FIGHTING MEASURES

- Severe explosion hazard, in the form of vapour, when exposed to flame or spark.
- Vapour may travel a considerable distance to source of ignition.
- Heating may cause expansion / decomposition with violent rupture of containers.
- On combustion, may emit toxic fumes of carbon monoxide (CO).

Other combustion products include:.

carbon dioxide (CO₂) and nitrogen oxides (NO_x).

FIRE INCOMPATIBILITY

Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result.

Personal Protective Equipment

Breathing apparatus.

Chemical splash suit.

Section 6 - ACCIDENTAL RELEASE MEASURES

EMERGENCY PROCEDURES

MINOR SPILLS

- Remove all ignition sources.
- Clean up all spills immediately.
- Avoid breathing vapours and contact with skin and eyes.
- Control personal contact by using protective equipment.
- Contain and absorb small quantities with vermiculite or other absorbent material.
- Wipe up.
- Collect residues in a flammable waste container.

Alternately spills may be diluted to non-flammable mixture with water and placed in clean drum.

MAJOR SPILLS

- Clear area of personnel and move upwind.
- Alert Fire Brigade and tell them location and nature of hazard.
- May be violently or explosively reactive.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Consider evacuation (or protect in place).
- No smoking, naked lights or ignition sources.
- Increase ventilation.
- Stop leak if safe to do so.
- Water spray or fog may be used to disperse vapour.
- Contain or absorb spill with sand, earth or vermiculite.
- Use only spark-free shovels and explosion proof equipment.
- Collect recoverable product into labelled containers for recycling.
- Collect solid residues and seal in labelled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

EMERGENCY RESPONSE PLANNING GUIDELINES (ERPG)

The maximum airborne concentration below which it is believed that nearly all individuals could be exposed

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Section 6 - ACCIDENTAL RELEASE MEASURES

for up to one hour WITHOUT experiencing or developing

life-threatening health effects is:

cyclohexylamine 200 ppm

irreversible or other serious effects or symptoms which could impair an individual's ability to take protective action is:

cyclohexylamine 40 ppm

other than mild, transient adverse effects without perceiving a clearly defined odour is:

cyclohexylamine 10 ppm

The threshold concentration below which most people will experience no appreciable risk of health effects:

cyclohexylamine 10 ppm

American Industrial Hygiene Association (AIHA)

Ingredients considered according to the following cutoffs

Very Toxic (T+)	$\geq 0.1\%$	Toxic (T)	$\geq 3.0\%$
R50	$\geq 0.25\%$	Corrosive (C)	$\geq 5.0\%$
R51	$\geq 2.5\%$		
else	$\geq 10\%$		

where percentage is percentage of ingredient found in the mixture

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS



+ X X X X +

+: May be stored together

O: May be stored together with specific precautions

X: Must not be stored together

Personal Protective Equipment advice is contained in Section 8 of the MSDS.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- Avoid smoking, naked lights, heat or ignition sources.
- When handling, DO NOT eat, drink or smoke.
- Vapour may ignite on pumping or pouring due to static electricity.
- DO NOT use plastic buckets.
- Earth and secure metal containers when dispensing or pouring product.
- Use spark-free tools when handling.
- Avoid contact with incompatible materials.

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Section 7 - HANDLING AND STORAGE

- Keep containers securely sealed.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions.

SUITABLE CONTAINER

- Polyethylene or polypropylene container.
- Check all containers are clearly labelled and free from leaks.

STORAGE INCOMPATIBILITY

- Avoid oxidising agents, acids, acid chlorides, acid anhydrides.
- Segregate from copper alloys and lead.

STORAGE REQUIREMENTS

- Store in original containers in approved flame-proof area.
- No smoking, naked lights, heat or ignition sources.
- DO NOT store in pits, depressions, basements or areas where vapours may be trapped.
- Keep containers securely sealed.
- Store away from incompatible materials in a cool, dry well ventilated area.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

- The following materials had no OELs on our records
- cyclohexylamine: CAS:108- 91- 8 CAS:157973- 60- 9 CAS:143247- 75- 0

ODOUR SAFETY FACTOR (OSF)

OSF=3.8 (CYCLOHEXYLAMINE)

Exposed individuals are NOT reasonably expected to be warned, by smell, that the Exposure Standard is being exceeded.

Odour Safety Factor (OSF) is determined to fall into either Class C, D or E.

The Odour Safety Factor (OSF) is defined as:

OSF= Exposure Standard (TWA) ppm/ Odour Threshold Value (OTV) ppm

Classification into classes follows:

Class	OSF	Description
A	550	Over 90% of exposed individuals are aware by smell that the Exposure Standard (TLV- TWA for example) is being reached, even when distracted by working activities
B	26- 550	As " A" for 50- 90% of persons being distracted

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

C	1- 26	As " A" for less than 50% of persons being distracted
D	0.18- 1	10- 50% of persons aware of being tested perceive by smell that the Exposure Standard is being reached
E	<0.18	As " D" for less than 10% of persons aware of being tested

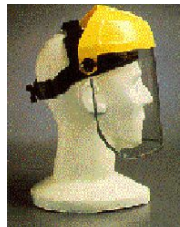
MATERIAL DATA

NOTE: Detector tubes for cyclohexylamine, measuring in excess of 2 ppm, are commercially available.

In view of the pronounced toxic and irritant effects of cyclohexylamine and the possibility that continued absorption might lead to carcinogenic, mutagenic or teratogenic effects, a TLV-TWA has been established.

A no-observed-effect level of 600 ppm, equivalent to an intake of 30 mg/kg cyclohexylamine chloride per day, has been recorded in rats.

PERSONAL PROTECTION



OR

EYE

- Safety glasses with side shields; or as required,
- Chemical goggles.
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

HANDS/FEET

- PVC gloves.
- Rubber gloves.
- Protective footwear.

OTHER

- Overalls.
- PVC Apron.
- PVC protective suit may be required if exposure severe.
- Eyewash unit.

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

- Ensure there is ready access to a safety shower.

RESPIRATOR

Selection of the Class and Type of respirator will depend upon the level of breathing zone contaminant and the chemical nature of the contaminant. Protection Factors (defined as the ratio of contaminant outside and inside the mask) may also be important.

Breathing Zone Level ppm (volume)	Maximum Protection Factor	Half- face Respirator	Full- Face Respirator
1000	10	AK- AUS	-
1000	50	-	AK- AUS
5000	50	Airline *	-
5000	100	-	AK- 2
10000	100	-	AK- 3
	100+		Airline**

* - Continuous Flow

** - Continuous-flow or positive pressure demand.

The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.

For further information consult your Occupational Health and Safety Advisor.

ENGINEERING CONTROLS

General exhaust is adequate under normal operating conditions. Local exhaust ventilation may be required in specific circumstances. If risk of overexposure exists, wear approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

Type of Contaminant:	Air Speed:
solvent, vapours, degreasing etc., evaporating from tank (in still air).	0.25- 0.5 m/s (50- 100 f/min)
aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation)	0.5- 1 m/s (100- 200 f/min.)
direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion)	1- 2.5 m/s (200- 500 f/min.)
grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion).	2.5- 10 m/s (500- 2000 f/min.)

Within each range the appropriate value depends on:

Lower end of the range

1: Room air currents minimal or favourable to capture

2: Contaminants of low toxicity or of nuisance

Upper end of the range

1: Disturbing room air currents

2: Contaminants of high toxicity

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Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

value only.

3: Intermittent, low production.

4: Large hood or large air mass in motion

3: High production, heavy use

4: Small hood- local control only

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE

Colourless to yellow liquid with a strong fishy amine odour. Strong base.
Completely miscible with water and common organic solvents including alcohols, ethers, ketones, esters, aliphatic hydrocarbons and aromatic hydrocarbons.

PHYSICAL PROPERTIES

Liquid.

Mixes with water.

Corrosive.

Alkaline.

Molecular Weight: 99.18

Melting Range (°C): - 17.7

Solubility in water (g/L): Miscible

pH (1% solution): 10.5

Volatile Component (%vol): 100

Relative Vapour Density (air=1): 3.42

Lower Explosive Limit (%): 1.5

Autoignition Temp (°C): 293

State: Liquid

Boiling Range (°C): 134.5

Specific Gravity (water=1): 0.8647 @ 25 C.

pH (as supplied): Not applicable

Vapour Pressure (kPa): 1.28 @ 25 deg.C

Evaporation Rate: Not available

Flash Point (°C): 18- 23

Upper Explosive Limit (%): 9.4

Decomposition Temp (°C): Not available

Viscosity: Not available

log Kow (Sangster 1997): 1.49

log Kow : 1.49-1.52

Section 10 - CHEMICAL STABILITY AND REACTIVITY INFORMATION

CONDITIONS CONTRIBUTING TO INSTABILITY

Presence of heat source and ignition source.

• Presence of open flame.

Presence of incompatible materials.

Stable under normal storage conditions.

Hazardous polymerisation will not occur.

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Section 11 - TOXICOLOGICAL INFORMATION

POTENTIAL HEALTH EFFECTS

ACUTE HEALTH EFFECTS

SWALLOWED

Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual.

The material can produce chemical burns within the oral cavity and gastrointestinal tract following ingestion.

Aliphatic and alicyclic amines are generally well absorbed from the gut. Corrosive action may cause tissue damage throughout the gastrointestinal tract. Detoxification is thought to occur in the liver, kidney and intestinal mucosa with the enzymes, monoamine oxidase and diamine oxidase (histaminase) having a significant role.

The substance and/or its metabolites may bind to haemoglobin inhibiting normal uptake of oxygen. This condition, known as "methaemoglobinemia", is a form of oxygen starvation (anoxia).

Symptoms include cyanosis (a bluish discolouration skin and mucous membranes) and breathing difficulties. Symptoms may not be evident until several hours after exposure.

At about 15% concentration of blood methaemoglobin there is observable cyanosis of the lips, nose and earlobes. Symptoms may be absent although euphoria, flushed face and headache are commonly experienced. At 25-40%, cyanosis is marked but little disability occurs other than that produced on physical exertion. At 40-60%, symptoms include weakness, dizziness, lightheadedness, increasingly severe headache, ataxia, rapid shallow respiration, drowsiness, nausea, vomiting, confusion, lethargy and stupor. Above 60% symptoms include dyspnea, respiratory depression, tachycardia or bradycardia, and convulsions. Levels exceeding 70% may be fatal.

EYE

The material can produce chemical burns to the eye following direct contact. Vapours or mists may be extremely irritating.

When applied to the eye(s) of animals, the material produces severe ocular lesions which are present twenty-four hours or more after instillation.

The material may produce severe irritation to the eye causing pronounced inflammation.

Repeated or prolonged exposure to irritants may produce conjunctivitis.

Vapours of volatile amines cause eye irritation with lachrymation, conjunctivitis and minor transient corneal oedema which results in "halos" around lights (glauropsia). This effect disappears spontaneously within a few hours of the end of exposure, and does not produce physiological after-effects. Although no detriment to the eye occurs as such, glauropsia predisposes an affected individual to physical accidents and reduces the ability to undertake skilled tasks such as driving a vehicle.

Direct local contact with the liquid may produce eye damage which may be permanent in the case of the lower molecular weight species.

SKIN

Skin contact with the material may be harmful; systemic effects may result following absorption.

The material can produce chemical burns following direct contact with the skin.

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CYCLOHEXYLAMINE

Section 11 - TOXICOLOGICAL INFORMATION

Toxic effects may result from skin absorption.

The material may produce severe skin irritation after prolonged or repeated exposure, and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) thickening of the epidermis.

Histologically there may be intercellular oedema of the spongy layer (spongiosis) and intracellular oedema of the epidermis. Prolonged contact is unlikely, given the severity of response, but repeated exposures may produce severe ulceration.

Volatile amine vapours produce primary skin irritation and dermatitis. Direct local contact, with the lower molecular weight liquids, may produce skin burns. Percutaneous absorption of simple aliphatic amines is known to produce lethal effects often the same as that for oral administration. Cutaneous sensitisation has been recorded chiefly due to ethyleneamines. Histamine release following exposure to many aliphatic amines may result in "triple response" (white vasoconstriction, red flare and wheal) in human skin.

INHALED

Evidence shows, or practical experience predicts, that the material produces irritation of the respiratory system in a substantial number of individuals following inhalation. Inhalation of amine vapours may cause irritation of the mucous membranes of the nose and throat and lung irritation with respiratory distress and cough. Single exposures to near lethal concentrations and repeated exposures to sublethal concentrations produces tracheitis, bronchitis, pneumonitis and pulmonary oedema. Aliphatic and alicyclic amines are generally well absorbed from the respiratory tract. Systemic effects include headache, nausea, faintness and anxiety. These effects are thought to be transient and are probably related to the pharmacodynamic action of the amines. Histamine release by aliphatic amines may produce bronchoconstriction and wheezing.

CHRONIC HEALTH EFFECTS

On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.

Principal routes of exposure are by accidental skin and eye contact and by inhalation of vapours especially at higher temperatures.

Repeated skin contact may cause a persistent irritation or dermatitis.

Repeated inhalation may cause lung damage.

Repeated overexposure may aggravate existing liver or kidney disease and aggravate or enhance existing nervous system dysfunction produced by disorders known to cause nervous system damage, such as diabetes, alcohol or drug abuse, and Parkinson's disease.

The metabolism of cyclohexylamine was studied intensively after the amine was implicated as a possible bladder carcinogen produced by cyclamate sweeteners. Cyclamate is converted by bacteria in the gut to cyclohexylamine prior to eventual excretion in the urine.

Many studies fail to produce any bladder tumours or any other apparent carcinogenic effects in animals. Rats fed on a diet containing 6000 ppm of the chloride for two years decreased their food intake and showed lower organ weights, slight anaemia and testicular atrophy (tubules with fewer spermatids) than in controls.

TOXICITY AND IRRITATION

TOXICITY

Oral (rat) LD50: 156 mg/kg

Inhalation (rat) LC50: 7500 mg/m³

Dermal (rabbit) LD50: 277 mg/kg

IRRITATION

Skin (human): 125 mg/48h SEVERE

Skin (rabbit): 2 mg/24h SEVERE

Eye (rabbit): 0.05 mg/24h SEVERE

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Section 11 - TOXICOLOGICAL INFORMATION

The substance is classified by IARC as Group 3:
NOT classifiable as to its carcinogenicity to humans.
Evidence of carcinogenicity may be inadequate or limited in animal testing.

Section 12 - ECOLOGICAL INFORMATION

Algae IC50 (72hr.) (mg/l): 0.02- 0.51
log Kow (Sangster 1997): 1.49

log Kow : 1.49-1.52
Koc: 154
Half-life (hr) air: 7
Half-life (hr) H2O surface water: 44
Henry's atm m³ /mol: 2.13E-05
BCF: 7.99
Toxicity invertebrate: cell mult. inhib.83->400mg/L
Effects on algae and plankton: cell mult. inhib. algae 5.3-46mg/L

Section 13 - DISPOSAL CONSIDERATIONS

- Consult manufacturer for recycling options and recycle where possible .
- Consult State Land Waste Management Authority for disposal.
- Incinerate residue at an approved site.
- Recycle containers if possible, or dispose of in an authorised landfill.

Section 14 - TRANSPORTATION INFORMATION



Labels Required: CORROSIVE,FLAMMABLE LIQUID
HAZCHEM: 2W

UNDG:

Dangerous Goods Class: 8
UN Number: 2357
Shipping Name:CYCLOHEXYLAMINE

Subrisk: 3
Packing Group: II

Air Transport IATA:

ICAO/IATA Class: 8
UN/ID Number: 2357
ERG Code: 8F
Shipping name:CYCLOHEXYLAMINE

ICAO/IATA Subrisk: 3
Packing Group: II

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Section 14 - TRANSPORTATION INFORMATION

Maritime Transport IMDG:

IMDG Class:	8	IMDG Subrisk:	3
UN Number:	2357	Packing Group:	II
EMS Number:	F- E, S- C		
Shipping name:CYCLOHEXYLAMINE			

Section 15 - REGULATORY INFORMATION

REGULATIONS

cyclohexylamine (CAS: 108-91-8) is found on the following regulatory lists;
IMO MARPOL 73/78 (Annex II) - List of Noxious Liquid Substances Carried in Bulk
International Council of Chemical Associations (ICCA) - High Production Volume List
OECD Representative List of High Production Volume (HPV) Chemicals

No data available for cyclohexylamine as CAS: 157973-60-9, CAS: 143247-75-0.

Section 16 - OTHER INFORMATION

INGREDIENTS WITH MULTIPLE CAS NUMBERS

Ingredient Name	CAS
cyclohexylamine	108- 91- 8, 157973- 60- 9, 143247- 75- 0

REPRODUCTIVE HEALTH GUIDELINES

Established occupational exposure limits frequently do not take into consideration reproductive end points that are clearly below the thresholds for other toxic effects. Occupational reproductive guidelines (ORGs) have been suggested as an additional standard. These have been established after a literature search for the reproductive no-observed-adverse effect-level (NOAEL) and the lowest-observed-adverse-effect-level (LOAEL). In addition the US EPA's procedures for risk assessment for hazard identification and dose-response assessment as applied by NIOSH were used in the creation of such limits. Uncertainty factors (UFs) have also been incorporated.

#32org

Ingredient	ORG	UF	Endpoi nt	CR	Adeq TLV
cyclohexylamine	4.3 mg/m3	25	R	NA	-

These exposure guidelines have been derived from a screening level of risk assessment and should not be construed as unequivocally safe limits. ORGS represent an 8-hour time-weighted average unless specified otherwise.

CR = Cancer Risk/10000; UF = Uncertainty factor:

TLV believed to be adequate to protect reproductive health:

LOD: Limit of detection

Toxic endpoints have also been identified as:

D = Developmental; R = Reproductive; TC = Transplacental carcinogen

Jankovic J., Drake F.: A Screening Method for Occupational Reproductive

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Section 16 - OTHER INFORMATION

American Industrial Hygiene Association Journal 57: 641-649 (1996).

The above information is believed to be accurate and represent the best information currently available to us, but does not represent any warranty expressed or implied of the properties of the product. User should make their own investigation to determine the suitability of the information for their particular purpose.

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