

Material Safety Data for: Cyclohexylamine

1. PRODUCT IDENTIFICATION

Name cyclohexylamine
Synonyms aminocyclohexane, cyclohexanamine, and others
CAS# 108-91-8
Product Uses rubber accelerator, corrosion inhibitor; manufacture of dyes & plasticisers

2. INGREDIENTS

	%	TWAEV / TLV mg/m ³	LD ₅₀ ORAL	(mg/kg) SKIN	LC ₅₀ ppm INHALATION
Cyclohexylamine	108-91-8	10 / 40	200	275	265

3. (a) HAZARDS SUMMARY

Hazards, Quick Guide: flammable, corrosive liquid, heavy vapour travels, distant ignition and flashback are possible

Canada – WHMIS

Key:

B2, D iB, D 2B, E

B 2 – Flash Point <38°C, **B 3** – Flash Point >38°C & <93°C

D 1 – Immediately Toxic, **D 2** – Chronic Toxicity

C – Oxidising Substance, **E** – Corrosive

U.S.A. – HMIS

Key:

Health – 3, Fire – 3, Reactivity – 2

0=minimal, **1**=slight, **2**=moderate, **3**=serious, **4**=severe

3. (b) HAZARDS – TOXICITY

Effects, Acute Exposure

Skin Contact irritating, may be corrosive if not washed off promptly
Skin Absorption yes; toxic effects may occur by this route
Eye Contact highly irritating, even at 1% dilution; vapour irritating – may cause a “blue haze” around bright objects which generally clears within a day
Inhalation irritation above 20ppm; headache, dizziness, drowsiness, anxiety & rapid heart rate
Ingestion corrosive to throat and mouth; may cause stomach discomfort

Effects, Chronic Exposure

General sneezing, wheezing may occur; repeated skin application unlikely due to severe acute effect
Sensitising not a known sensitiser in humans or animals, however other amines are known to be respiratory and skin sensitisers
Carcinogen/Tumorigen not considered a tumorigen or a carcinogen in humans or animals
Reproductive Effect no known effect in humans; testicular injury in rodents at doses of 200-400mg/kg/day
Mutagen not known for certain; mutagenicity testing produced equivocal results
Synergistic With not known
LD₅₀ (oral) 620mg/kg (rat), 200-400mg/kg (mouse)
LD₅₀ (skin) 275mg/kg (rabbit), 860-4300mg/kg (guinea pig)
LC₅₀ (inhalation) 265ppm (mouse), 500ppm (mouse), 1850ppm (rat)

Please ensure that this MSDS is given to, and explained to people using this product.

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4. FIRST AID

SKIN: Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.
 EYES: Wash eyes with plenty of water, holding eyelids open. Seek medical assistance promptly if there is irritation.
 INHALATION: Remove from contaminated area promptly. **CAUTION: Rescuer must not endanger himself!** If breathing stops, administer artificial respiration and seek medical aid promptly.
 INGESTION: Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited material. Seek medical help promptly.
Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.

5. PHYSICAL PROPERTIES

Odour & Appearance	clear, colourless-yellowish liquid with strong amine (fishy) odour
Odour Threshold	2.6ppm, <i>but values up to 110ppm have been reported . . .</i>
Vapour Pressure	10.7mmHg / 1.43kPa (20°C / 68°F)
Evaporation Rate (<i>Butyl Acetate = 1</i>)	not known
Vapour Density (air = 1)	3.4
Boiling Range	134°C / 274°F
Freezing Point	-18°C / 0°F
Specific Gravity	0.865 (25/25°C)
Water Solubility	complete
Also soluble in	most organic solvents
Viscosity	210centipoise (25°C / 77°F)
pH	11.8 – strongly alkaline
Conversion Factor	1ppm = 4.05g/m ³
Molecular Weight	99grams per mole

6. FLAMMABILITY & FIRE FIGHTING

Flash Point	26.5°C / 80°F (closed cup) – also reported as 31°C / 88°F
Autoignition Temperature	265°C / 509°F
Flammable Limits	1.5% – 9.4%
Combustion Products	carbon monoxide, nitrogen oxides, ammonia, smoke, part oxidised hydrocarbon fragments
Fire Fighting Precautions	alcohol resistant foam, dry chemical, water fog, water spray to cool & dilute, product floats on water – water jet spreads flames; fire fighters must wear SCBA
Static Charge Accumulation	cannot accumulate a static charge on agitation or pumping

7. STABILITY / REACTIVITY

Dangerously Reactive With	strong oxidising agents, acids, acid chlorides, anhydrides, halogens& halogenated compounds
Also Reactive With	nitromethane, nitrosyl perchlorate and hypochlorites to form explosive compounds; corrosive to copper and copper alloys, plus zinc, galvanised steel and aluminum
Stability	stable; will not polymerise; gradually reacts with CO ₂ in the air to form a carbamate salt
Decomposes in Presence of	not known
Decomposition Products	none apart from Hazardous Combustion Products
Sensitive to Mechanical Impact	no

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8. PROTECTIVE EQUIPMENT / EXPOSURE CONTROL

ACGIH TLV	10ppm / 41mg/m ³
OSHA PEL	not listed
STEL	not listed
Ventilation	mechanical ventilation may be required to maintain airborne titre below TLV; respirators with organic vapour cartridges should be available for all employees working nearby for “escape” purposes, should ventilation fail (<i>respirators should be kept in air-tight containers (eg: “Tupperware”)</i> to preserve “freshness
Hands	“Tychem” or “Responder” gloves – <i>other types may also protect; consult supplier to confirm suitability</i>
Eyes	safety goggles; a face shield may also be required if splashing is possible
Clothing	wear impermeable (above) apron, boots, & long sleeves if there is any danger of splashing,

9. HANDLING & STORAGE

Store in a cool, dry environment, away from sources of ignition, heat and oxidising agents. Use non-sparking bronze or aluminium hand tools. (*Note that aluminium and bronze will corrode with cyclohexylamine.*) All electrical and mechanical equipment (including lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof. Empty containers may contain a flammable / explosive vapour.

This product reacts with oxygen in air and yellows gradually. This product gradually neutralises with CO₂ in air to form carbamates. Always ensure that containers, whether empty or full, or part full, are tightly sealed unless in use.

Avoid breathing product vapour. Use with adequate ventilation. If dealing with a spill, always wear a suitable respirator (see Part 8).

Never cut, drill, weld or grind on or near this container. Avoid all contact with skin and wash work clothes frequently. An eye bath and safety shower must be available near the workplace.

10. SPILL PROCEDURES

Summer Fire Potential: blanket spill with foam as a precaution against accidental ignition if temperature exceeds 20°C. Take extreme care to avoid sparks – do not operate (turn on OR off) electrical appliances near spill, unless explosion proof.

Leak Precaution	dyke to control spillage and prevent environmental contamination
Handling Spill	ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic shovel, & store in closed containers for recycling or disposal

11. DISPOSAL

Waste Disposal	do not flush to sewer , recycle solvent if possible, local regulations may still permit disposal in sanitary landfill, may be incinerated in approved facility with flue gas monitoring and scrubbing
Containers	Drums should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use. Pails must be vented and thoroughly dried prior to crushing and recycling. IBCs (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs). Steel containers must be inspected, pressure tested & recertified every 5 years. <i>Never cut, drill, weld or grind on or near this container, even if empty</i>

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12. ENVIRONMENTAL INFORMATION

Bioaccumulation	this product is readily excreted from the body and cannot bioaccumulate
Biodegradation	this product degrades readily and rapidly in the presence of oxygen; degradation of 79% in 14 days in sewage sludge
Abiotic Degradation	this product reacts with atmospheric hydroxyl radicals; its estimated half-life in air is 7 hours
Mobility in soil, water	this product is water soluble and will move readily in soil and water, however, the neutralised substance adsorbs strongly to soil particles and movement may be greatly slowed by this

Aquatic Toxicity

LC ₅₀ (Fish, 96hr)	470mg/litre (brachydanio rerio), 44-90mg/litre (oncorhynchus mykiss),
EC ₅₀ (Crustacea, 24hr)	49-80mg/litre (daphnia magna)
EC ₅₀ (Algae, 96hr)	20mg/litre (selenastrum capricornutum)
EC ₅₀ (Bacteria, 3hr)	2152mg/litre (sewage sludge)

13. TRANSPORT REGULATIONS

Canada TDG	PIN	UN-2357
AND	Shipping Name	cyclohexylamine
U.S.A. 49 CFR	Class	8 (3)
	Packing Group	II
Marine Pollutant		not a marine pollutant

14. EMERGENCY INFORMATION

Canada	Call CANUTEC (collect)	(613) 996-6666
U.S.A.	Call CHEMTREC	(800) 424-9300

15. REGULATIONS

Canada DSL	on inventory
U.S.A. TSCA	on inventory
Europe EINECS	on inventory (EC# 203-629-0)

NIOSH Recommendations: Recommended Exposure Limit: 10 Hr Time-Weighted avg: 10 ppm (40 mg/cu m).

Threshold Limit Values: 8 hr Time Weighted Avg (TWA): 10 ppm. Excursion Limit Recommendation: Excursions in worker exposure levels may exceed three times the TLV-TWA for no more than a total of 30 min during a work day, and under no circumstances should they exceed five times the TLV-TWA, provided that the TLV-TWA is not exceeded. A4: Not classifiable as a human carcinogen.

Atmospheric Standards: This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Cyclohexylamine is produced, as an intermediate or a final product, by process units covered under this subpart.

State Drinking Water Guidelines: Florida 5,000 ug/l

CERCLA Reportable Quantities: Releases of CERCLA hazardous substances are subject to the release reporting requirement of CERCLA section 103, codified at 40 CFR part 302, in addition to the requirements of 40 CFR part 355. Cyclohexylamine is an extremely hazardous substance (EHS) subject to reporting requirements when stored in amounts in excess of its threshold planning quantity (TPQ) of 10,000 lbs.

16. PREPARATION INFORMATION

Prepared for Megaloid Laboratories by Peter Bursztyn, (705) 734-1577

File Name: **cyclohexylamine**

With data from RTECS, Haz. Substance Data Base, Cheminfo (CCOHS), IUCLID Datasheets (European Chem. Substance Info. System), & others, as available

Preparation Date: **October 2003** Revision Date: **July 2006, July 2009**

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