MONSANTO PRODUCT NAME
CYCLOHEXYLAMINE

MONSANTO COMPANY
800 N. LINDBERGH BLVD.
ST. LOUIS, MO 63167

Emergency Phone No.
(Call Collect)
314-694-1000

PRODUCT IDENTIFICATION

Synonyms:	CHA; Hexahydroaniline; Aminohexahydrobenzene
Chemical Name:	Aminocyclohexane
Chemical Formula:	$C_6H_{13}N$
CAS No.:	108-91-8
DOT Proper Shipping Name:	Cyclohexylamine
DOT Hazard Class/I.D. No.:	Flammable Liquid/ UN2357
DOT Label:	Flammable Liquid and Corrosive
U.S. Surface Freight Classification:	Cyclohexylamine (Chemicals, N.O.I.B.N.)
Reportable Quantity (RQ) Under Clean Water Act Regulations (40 CFR Part 117):	Not Applicable

This substance is identified as a hazardous chemical under the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200).

WARNING STATEMENTS

DANGER!
FLAMMABLE
CAUSES BURNS TO EYES AND SKIN
HARMFUL IF ABSORBED THROUGH SKIN
CAUSES IRRITATION TO RESPIRATORY TRACT

PRECAUTIONARY MEASURES

Do not get in eyes, on skin, or on clothing.
Avoid breathing vapor or mist.
Keep container closed.
Use with adequate ventilation.
Wash thoroughly after handling.
Keep away from heat, sparks and flame.

Emptied container retains vapor and product residue. Observe all labeled safeguards until container is cleaned, reconditioned or destroyed. DO NOT CUT OR WELD ON OR NEAR THIS CONTAINER.

EMERGENCY AND FIRST AID PROCEDURES

FIRST AID: IF IN EYES OR ON SKIN, immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Call a physician. Wash clothing before reuse. Destroy contaminated shoes.

IF INHALED, remove to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician. Remove material from eyes, skin and clothing.

(Emergency And First Aid Procedures Continued On Next Page)

EMERGENCY AND FIRST AID PROCEDURES (Continued)

IN CASE OF:
FIRE, use water spray, foam, dry chemical or CO_2.
SPILL or LEAK, keep people away. Shut off or extinguish all sources of ignition. Shut off leak if without risk. Keep upwind. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Contain spilled liquid, recover by pumping into drums/containers or with suitable absorbent (see "Spill, Leak & Disposal Information" section).

OCCUPATIONAL CONTROL PROCEDURES

Eye Protection: Wear chemical goggles and have eye baths immediately available where there is potential for eye contact.

Skin Protection: Wear appropriate chemical resistant gloves and clothing to prevent skin contact. Consult glove manufacturer to determine appropriate type glove for given application. Wear chemical goggles, a full face shield and a chemical resistant apron when splashing is likely. Wash immediately if skin is contaminated. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

Respiratory Protection: Avoid breathing vapor or mist. Use NIOSH/MSHA approved equipment when airborne exposure limits (see below) are exceeded. Full facepiece equipment is recommended. Consult respirator manufacturer to determine appropriate type equipment for given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. Respiratory protection programs must be in compliance with 29 CFR 1910.134.

Ventilation: Provide sufficient ventilation to control exposure levels below airborne exposure limits (see below). Use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Airborne Exposure Limits: Product: Cyclohexylamine

OSHA PEL/8-hour Time-weighted average:	None established
ACGIH TLV/8-hour Time-weighted average:	10 ppm (40 mg/m³) - Skin*

** Skin notation means that skin absorption of this material may add to the overall exposure. Avoid skin contact.*

FIRE PROTECTION INFORMATION

Flash Point: 75°F ***Method:*** Pensky-Martens Closed Cup

Extinguishing Media: Water spray, foam, dry chemical, carbon dioxide or any Class B extinguishing agent. Use water spray to keep fire exposed containers cool.

Special Firefighting Procedures: Firefighters and others who may be exposed to vapors or products of combustion (see "Hazardous Decomposition Products" below) *must* wear full protective (impervious) clothing including self-contained breathing apparatus and boots. Fire fighting equipment *must* be thoroughly decontaminated after use.

Unusual Fire and Explosion Hazards: This is a harmful chemical. Avoid inhalation of vapors and exposure to skin. Hazardous products of decomposition include carbon monoxide and oxides of nitrogen.

REACTIVITY DATA

Materials to Avoid: Acids, oxidizing agents, all copper alloys, lead.

Hazardous Decomposition Products: Nitrogen oxides, smoke, soot, carbon monoxide, when decomposed in air.

Hazardous Polymerization: Does not occur.

HEALTH EFFECTS SUMMARY

The following information presents both human experience and the results of scientific experiments used by qualified experts to assess the effects of cyclohexylamine on the health of industrially exposed individuals and to support the Precautionary Measures and Occupational Control Procedures recommended in this document. To avoid misunderstanding, the data provided in this section should be interpreted by individuals trained in evaluation of this type of information.

Human Experience

Dermal contact and inhalation are expected to be the primary routes of occupational exposure to cyclohexylamine. This material is considered to be corrosive to the eyes and skin. Occupational exposure to this material has been reported to cause severe irritation to the respiratory tract. Exposure to cyclohexylamine may cause restlessness, drowsiness, anxiety, nausea and vomiting. Prolonged or repeated exposure to low concentrations of cyclohexylamine may cause dermatitis.

Toxicological Data

Data from Monsanto studies and from the available scientific literature indicate the following:

Oral LD_{50} (Rat): 590 mg/kg, Slightly Toxic
Dermal LD_{50} (Rabbit): 631 mg/kg, Moderately Toxic
Eye Irritation (Rabbit): (FHSA) Corrosive
Skin Irritation (Rabbit): (FHSA) Corrosive
Vapor Inhalation (Rat): 0 out of 6 rats died when exposed to 13.7 mg/l, nominal concentration, of cyclohexylamine for 6 hours. 2 out of 6 animals were blinded.

Groups of rats were administered a diet containing 600, 2,000 or 6,000 ppm cyclohexylamine for 13 weeks. At the two higher levels, reduced body weight gain food intake, and relative testes weight in spermatogenesis were observed. The no-effect level for this study was determined to be 600 ppm cyclohexylamine in the diet.

Reduction of testicular spermatogenesis was observed in rats and dogs receiving 200 mg/kg/day and 250 mg/kg/day, respectively by oral gavage for 90 days. The effect was reversible in dogs but not in rats after a 13 week recovery period. A no-effect level was not determined in this study.

Groups of 48 male and 48 female rats were given dietary mixtures of cyclohexylamine which resulted in average daily intakes of 24, 82 and 300 mg/kg in males and 35, 120 and 440 mg/kg in females. A dose-related depression in weight gain was seen throughout the study. Although tumors occurred in all treatment groups, the locations, incidences and types of tumors were not considered to be different between groups.

No reproductive effects were observed when groups of male rats fed either 0 or 6,000 ppm cyclohexylamine in the diet for 10 months were mated with untreated females. Fertility and litter size, and number and viability of offspring, were not adversely affected by treatment.

Groups of 15 female rats were given oral doses of cyclohexylamine on days 7 through 13 of gestation at dosages of 1.8, 3.6, 18 or 36 mg/kg. At 36 mg/kg, decreased body weight gain and decreased food and water consumption, especially during compound administration, were reported. Two animals died in the high-dose group. All treated animals were comparable to controls in observations for embryotoxicity, fetotoxicity and teratogenicity.

Microbial mutagenicity assays using five *Salmonella* strains with and without mammalian microsomal activation, and one yeast strain did not reveal any mutagenic activity. Contradictory results have been reported for the potential of cyclohexylamine to induce chromosomal damage. Increases in chromosome breaks in human fibroblasts, Chinese hamster fibroblasts and human lymphocytes cultured *in vitro* have been reported. Other studies have reported no significant chromosome changes in human lymphocytes.

PHYSICAL DATA

Appearance:	Colorless liquid
Odor:	Strong fishy
Boiling Point:	134.5°C
Melting Point:	-17.7°C
Viscosity @ 20°C:	1.662 centipoises
Specific Gravity @ 25/25°C:	0.8647
Solubility in Water:	Miscible
Vapor Pressure @ 25°C:	10.4 mm Hg
@ 50°C:	36.8 mm Hg
Vapor Density (Air = 1):	3.42

Note: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

SPILL, LEAK & DISPOSAL INFORMATION

Waste Disposal: When discarded, cyclohexylamine is a "hazardous waste" as that term is defined in 40 CFR 261, "Identification and Listing of Hazardous Waste" because of its characteristic of ignitability. Burn in an approved incinerator or spray with water or foam to reduce fire and fume hazard and dispose of in an approved chemical landfill in accordance with all applicable local, state and federal laws and regulations. Consult your attorney or appropriate regulatory officials for information on such disposal.

Spill or Leakage Procedures: Keep people away. Shut off or extinguish all sources of ignition. Shut off leak if without risk. Keep upwind. If necessary to enter spill area, wear self-contained breathing apparatus and full protective clothing including boots. Contain spilled liquid, recover by pumping into drums/containers or with suitable absorbent. Keep this material out of watersheds and waterways. Flush with water spray and notify pollution control authorities. Run-off to sewers may create health and explosion hazards; notify fire, health and pollution control authorities.

Containers: Burn in an approved incinerator or spray with water or foam to reduce fire and fume hazard and dispose of in an approved chemical landfill in accordance with all applicable local, state and federal laws and regulations.

For further information refer to DOT Emergency Response Guidebook, Guide #68.

FOR EMERGENCY ASSISTANCE CALL MONSANTO/CHEMTREC 800 424-9300.

ADDITIONAL COMMENTS

Environmental Toxicity Information:

96-hr LC_{50} Bluegill: 100 mg/l, Practically Nontoxic
96-hr LC_{50} Trout: 150 mg/l, Practically Nontoxic
96-hr LC_{50} Fathead Minnow: 70 mg/l, Slightly Toxic
96-hr EC_{50} Algae, Cell Count: 6.2 mg/l, Moderately Toxic
48-hr LC_{50} *Daphnia*: 63 mg/l, Slightly Toxic

For further product information, including product forms, characteristics and applications, and FDA regulations, please refer to the Monsanto Rubber Chemicals *Purchasing Guide*.

DATE: 6/86 **SUPERSEDES:** 7/1/85

MSDS NO.: 000108918

FOR ADDITIONAL NON-EMERGENCY INFORMATION, CONTACT:

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