Material Safety Data Sheet

Cyclohexanone

Section 1 - Chemical Product

MSDS Name: Cyclohexanone

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
108-94-1	Cyclohexanone	98+	203-631-1

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: APHA: 10 max liquid. Flash Point: 46 deg C.
Warning! Possible cancer hazard. May cause cancer based on animal data. **Flammable liquid and vapor.** Harmful if inhaled. Causes eye and skin irritation. May cause respiratory tract irritation. May cause central nervous system effects.
Target Organs: Blood, kidneys, central nervous system, liver, respiratory system, eyes, skin.

Potential Health Effects

Eye: Causes eye irritation. Undiluted cyclohexanone placed in the eyes of rabbits caused marked irritation and some corneal injury.
Skin: Causes skin irritation. May be harmful if absorbed through the skin. Cyclohexanone was not a sensitizer in the guinea pig maximization test and the mouse ear swelling test. There has been one case report of sensitization to cyclohexanone itself in a patient using a PVC adhesive composed of 100% cyclohexanone; patch testing confirmed the sensitization.
Ingestion: May cause irritation of the digestive tract. May be harmful if swallowed. May cause central nervous system effects.
Inhalation: Harmful if inhaled. May cause respiratory tract irritation. May cause central nervous system effects. Cyclohexanone has caused damage to the liver and kidneys in rabbits exposed by inhalation to an airborne concentration of 190 ppm.
Chronic: Possible cancer hazard based on tests with laboratory animals. Prolonged or

repeated skin contact may cause dermatitis. May cause liver and kidney damage. Adverse reproductive effects have been reported in animals. Laboratory experiments have resulted in mutagenic effects. Chronic exposure may cause blood effects.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.
Skin: Get medical aid. Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Ingestion: Do not induce vomiting. Get medical aid.
Inhalation: Get medical aid immediately. Remove from exposure and move to fresh air immediately. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.
Notes to Physician: Treat symptomatically and supportively.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Vapors can travel to a source of ignition and flash back. Will burn if involved in a fire. Containers may explode in the heat of a fire. Flammable liquid and vapor.
Extinguishing Media: Use water spray to cool fire-exposed containers. Use foam, dry chemical, or carbon dioxide. Water may be ineffective.
Flash Point: 46 deg C (114.80 deg F)
Autoignition Temperature: 520 deg C (968.00 deg F)
Explosion Limits, Lower:1.10 vol %
Upper: 8.10 vol %
NFPA Rating: (estimated) Health: 2; Flammability: 2; Instability: 0

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Wear a self contained breathing apparatus and appropriate personal protection. (See Exposure Controls, Personal Protection section). Remove all sources of ignition. Use a spark-proof tool. Do not let this chemical enter the environment.

Section 7 - Handling and Storage

Handling: Use spark-proof tools and explosion proof equipment. Do not get in eyes, on skin, or on clothing. Take precautionary measures against static discharges. Keep away from heat, sparks and flame. Do not ingest or inhale. Use only in a chemical fume hood.
Storage: Keep away from sources of ignition. Store in a cool, dry place. Store in a tightly closed container. Flammables-area.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or utilizing this material should be equipped with an eyewash facility and a safety shower. Use only under a chemical fume hood.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Cyclohexanone	20 ppm TWA; 50 ppm STEL; Skin - potential significant contribution to overall exposure by the cutaneous r oute	25 ppm TWA; 100 mg/m3 TWA 700 ppm IDLH	50 ppm TWA; 200 mg/m3 TWA

OSHA Vacated PELs: Cyclohexanone: 25 ppm TWA; 100 mg/m3 TWA
Personal Protective Equipment
Eyes: Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin: Wear appropriate protective gloves to prevent skin exposure.
Clothing: Wear appropriate protective clothing to prevent skin exposure.
Respirators: Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Section 9 - Physical and Chemical Properties

Physical State: Liquid
Appearance: clear, colorless - APHA: 10 max
Odor: none reported
pH: Not applicable.
Vapor Pressure: 4.5 mbar @ 20 deg C
Vapor Density: 3.4 (air=1)
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 155 deg C @ 760 mmHg
Freezing/Melting Point:-47 deg C
Decomposition Temperature: Not available.
Solubility: Slightly soluble.
Specific Gravity/Density:0.947

Molecular Formula:C6H10O
Molecular Weight:98.14

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures.
Conditions to Avoid: Incompatible materials, ignition sources, excess heat.
Incompatibilities with Other Materials: Reducing agents, plastics.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Will not occur.

Section 11 - Toxicological Information

RTECS#:
CAS# 108-94-1: GW1050000
LD50/LC50:
CAS# 108-94-1:
Draize test, rabbit, eye: 20 mg Severe;
Draize test, rabbit, eye: 250 ug/24H Severe;
Inhalation, mouse: LC50 = 2375 mg/m3;
Inhalation, rat: LC50 = 8000 ppm/4H;
Inhalation, rat: LC50 = 19000 mg/m3;
Oral, mouse: LD50 = 1400 mg/kg;
Oral, rat: LD50 = 1620 uL/kg;
Oral, rat: LD50 = 1800 mg/kg;
Skin, rabbit: LD50 = 1 mL/kg;
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Carcinogenicity:
CAS# 108-94-1:

- **ACGIH:** A3 - Confirmed animal carcinogen with unknown relevance to humans
- **California:** Not listed.
- **NTP:** Not listed.
- **IARC:** Not listed.

Epidemiology: ACGIH has labeled this substance as a confirmed animal carcinogen.
Teratogenicity: Teratogenic effects have occurred in experimental animals.
Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.
Mutagenicity: Mutation in microorganisms:See actual entry in RTECS for complete information.
Neurotoxicity: No information found
Other Studies:

Section 12 - Ecological Information

Ecotoxicity: Fish: Rainbow trout: LC50 = 90.0 mg/L; 96 Hr.; 320.0 mg/L CaCO3Fish: Rainbow trout: LC50 = 44.0 mg/L; 96 Hr.; 20.0 mg/L CaCO3Fish: Fathead Minnow: LC50 = 527.0 mg/L; 96 Hr.; Flow-through, 24-26 degrees C,pH7.5Water flea Daphnia: EC50 = 820.0 mg/L; 48 Hr.; UnspecifiedAlgae: EC50 = 20.0 mg/L; 96 Hr.; UnspecifiedBacteria: Phytobacterium phosphoreum: EC50 = 18.7 mg/L; 5 minutes; Microtox Test No data available.
Environmental: This chemical is expected to rapidly volatilize based on its low melting and boiling point. Cyclohexanone is estimated to be highly mobile in soil. In view of its moderate vapor pressure and low adsorption to soil, it would be expected to volatilize from surface soil. Although data are lacking, it may also undergo direct photolysis on the soil surface. Cyclohexanone is readily biodegradable according to aerobic screening tests and therefore would be expected to biodegrade in soil.
Physical: No information found.
Other: The bioconcentration factor (BCF) for cyclohexanone can be estimated to be 2.4 based on the log Kow of 0.81 and a recommended regression equation. This BCF indicates that cyclohexanone will not bioconcentrate in aquatic organisms.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.
RCRA P-Series: None listed.
RCRA U-Series:
CAS# 108-94-1: waste number U057 (Ignitable waste).

Section 14 - Transport Information

	US DOT	Canada TDG
Shipping Name:	CYCLOHEXANONE	CYCLOHEXANONE
Hazard Class:	3	3
UN Number:	UN1915	UN1915
Packing Group:	III	III

Section 15 - Regulatory Information

US FEDERAL

TSCA
CAS# 108-94-1 is listed on the TSCA inventory.
Health & Safety Reporting List
CAS# 108-94-1: Effective 10/4/82, Sunset 10/4/92

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

CERCLA Hazardous Substances and corresponding RQs

CAS# 108-94-1: 5000 lb final RQ; 2270 kg final RQ

SARA Section 302 Extremely Hazardous Substances

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 108-94-1: immediate, delayed, fire.

Section 313 No chemicals are reportable under Section 313.

Clean Air Act:

This material does not contain any hazardous air pollutants.
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.

Clean Water Act:

None of the chemicals in this product are listed as Hazardous Substances under the CWA.
None of the chemicals in this product are listed as Priority Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 108-94-1 can be found on the following state right to know lists: California, New Jersey, Pennsylvania, Minnesota, Massachusetts.

California Prop 65

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols:

XN

Risk Phrases:

R 10 Flammable.
R 20 Harmful by inhalation.

Safety Phrases:

S 25 Avoid contact with eyes.

WGK (Water Danger/Protection)

CAS# 108-94-1: 1

Canada - DSL/NDSL

CAS# 108-94-1 is listed on Canada's DSL List.

Canada - WHMIS

This product has a WHMIS classification of B3, D2B.
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

Canadian Ingredient Disclosure List

CAS# 108-94-1 is listed on the Canadian Ingredient Disclosure List.