



SILVER FERN CHEMICAL, INC.

Safety Data Sheet

Cyclohexanone

Safety Data Sheet Cyclohexanone (EC)

Revision date : 2015/03/16

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Version: 1.4

1. Identification

Product identifier used on the label

Cyclohexanone (EC)

Recommended use of the chemical and restriction on use

Recommended use*: initial product for chemical syntheses; solvent(s)

* The "Recommended use" identified for this product is provided solely to comply with a Federal requirement and is not part of the seller's published specification. The terms of this Safety Data Sheet (SDS) do not create or infer any warranty, express or implied, including by incorporation into or reference in the seller's sales agreement.

Details of the supplier of the safety data sheet

Company:

Silver Fern Chemical, Inc.

2226 Queen Anne Avenue North, Suite C

Seattle, WA 98109, USA

Phone: 1-866-282-3384

Business Contact

Customer Service: 1-866-282-3384

info@silverfernchemical.com

Emergency telephone number

24 Hour Emergency Contact: Infotrac 1-800-535-5053 (USA & Canada)

Outside USA & Canada 1-352-323-3500

Other means of identification

Molecular formula:

C(6)H(10)O

Synonyms:

Cyclohexanone

2. Hazards Identification

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

Classification of the product

Flam. Liq.	3	Flammable liquids
Acute Tox.	4 (Inhalation - vapor)	Acute toxicity
Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	4 (dermal)	Acute toxicity
Skin Corr./Irrit.	2	Skin corrosion/irritation
Eye Dam./Irrit.	1	Serious eye damage/eye irritation
Aquatic Acute	3	Hazardous to the aquatic environment - acute

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Label elements

Pictogram:



Signal Word:
Danger

Hazard Statement:

H226	Flammable liquid and vapor.
H318	Causes serious eye damage.
H315	Causes skin irritation.
H312	Harmful in contact with skin.
H332	Harmful if inhaled.
H302	Harmful if swallowed.
H402	Harmful to aquatic life.

Precautionary Statements (Prevention):

P280	Wear protective gloves and eye/face protection.
P271	Use only outdoors or in a well-ventilated area.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260	Do not breathe mist or vapor.
P243	Take precautionary measures against static discharge.
P273	Avoid release to the environment.
P241	Use explosion-proof electrical/ventilating/lighting/equipment.
P270	Do not eat, drink or smoke when using this product.
P264	Wash with plenty of water and soap thoroughly after handling.
P233	Keep container tightly closed.
P242	Use only non-sparking tools.
P240	Ground/bond container and receiving equipment.

Precautionary Statements (Response):

P310	Immediately call a POISON CENTER or doctor/physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P303 + P352	IF ON SKIN (or hair): Wash with plenty of soap and water.
P361	Take off immediately all contaminated clothing.
P301 + P330	IF SWALLOWED: rinse mouth.
P332 + P313	If skin irritation occurs: Get medical advice/attention.
P370 + P378	In case of fire: Use to extinguish.

Precautionary Statements (Storage):

P403 + P235	Store in a well-ventilated place. Keep cool.
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Precautionary Statements (Disposal):

P501	Dispose of contents/container to hazardous or special waste collection point.
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According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

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Emergency overview

WARNING:
COMBUSTIBLE LIQUID.
HARMFUL IF SWALLOWED.
HARMFUL IF INHALED.
HARMFUL IF ABSORBED THROUGH SKIN.
INGESTION MAY CAUSE GASTRIC DISTURBANCES.
CAUSES EYE, SKIN AND RESPIRATORY TRACT IRRITATION.
RISK OF SERIOUS DAMAGE TO EYES.
Prolonged or repeated contact may result in dermatitis.
Avoid contact with the skin, eyes and clothing.
Avoid inhalation of mists/vapours.
Use with local exhaust ventilation.
Wear NIOSH-certified chemical goggles.
Wear chemical resistant protective gloves.
Wear protective clothing.
Eye wash fountains and safety showers must be easily accessible.

3. Composition / Information on Ingredients

According to Regulation 2012 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
108-94-1	> 99.0 %	cyclohexanone

According to Regulation 1994 OSHA Hazard Communication Standard; 29 CFR Part 1910.1200

<u>CAS Number</u>	<u>Content (W/W)</u>	<u>Chemical name</u>
108-94-1	> 99.0 %	cyclohexanone

4. First-Aid Measures

Description of first aid measures

General advice:

Take off immediately all contaminated clothing. Avoid contact with the skin, eyes and clothing.

If inhaled:

Remove the affected individual into fresh air and keep the person calm. Assist in breathing if necessary. Immediate medical attention required.

If on skin:

Wash affected areas thoroughly with soap and water. Immediate medical attention required. If irritation develops, seek medical attention.

If in eyes:

In case of contact with the eyes, rinse immediately for at least 15 minutes with plenty of water. Immediate medical attention required.

If swallowed:

Rinse mouth and then drink plenty of water. Induce vomiting. Never induce vomiting or give anything by mouth if the victim is unconscious or having convulsions. Immediate medical attention required.

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Most important symptoms and effects, both acute and delayed

Symptoms: Overexposure may cause:, unconsciousness, headache

Indication of any immediate medical attention and special treatment needed

Note to physician

Treatment: Treat according to symptoms (decontamination, vital functions), no known specific antidote.

5. Fire-Fighting Measures

Extinguishing media

Suitable extinguishing media:
water spray, foam, dry powder, gaseous extinguishing media, carbon dioxide

Unsuitable extinguishing media for safety reasons:
water

Special hazards arising from the substance or mixture

Advice for fire-fighters

Protective equipment for fire-fighting:
Firefighters should be equipped with self-contained breathing apparatus and turn-out gear.

Further information:

Vapours are heavier than air and may accumulate in low areas and travel a considerable distance up to the source of ignition. If exposed to fire, keep containers cool by spraying with water. Fight fire from maximum distance. Firefighting should be done from explosion resistant locations.

Impact Sensitivity:

Remarks: Based on the chemical structure there is no shock-sensitivity.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation. Sources of ignition should be kept well clear. Avoid contact with skin and eyes. Use breathing apparatus if exposed to vapours/dust/aerosol. Information regarding personal protective measures see, section 8.

Environmental precautions

Substance/product is RCRA hazardous due to its properties.

Methods and material for containment and cleaning up

Spills should be contained, solidified, and placed in suitable containers for disposal.

7. Handling and Storage

Precautions for safe handling

Use antistatic tools.

Protection against fire and explosion:

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No explosion proofing necessary. Exhaust fans should be explosion proof.

Temperature class: T2 (Autoignition temperature >300 °C).

Conditions for safe storage, including any incompatibilities

Segregate from oxidants.

Suitable materials for containers: Carbon steel (Iron), Stainless steel 1.4401, Stainless steel 1.4301 (V2), glass

Further information on storage conditions: Avoid extreme heat. Keep away from sources of ignition - No smoking. Keep container tightly closed in a cool, well-ventilated place. Storage containers should be grounded.

Storage stability:

Keep under nitrogen.

May discolour after lengthy storage.

8. Exposure Controls/Personal Protection

Components with occupational exposure limits

cyclohexanone	OSHA PEL	PEL 50 ppm 200 mg/m ³ ; TWA value 25 ppm 100 mg/m ³ ; SKIN_FINAL ; The substance can be absorbed through the skin.
	ACGIH TLV	TWA value 20 ppm ; Skin Designation ; The substance can be absorbed through the skin. STEL value 50 ppm ;

Advice on system design:

Provide local exhaust ventilation to maintain recommended P.E.L.

Personal protective equipment

Respiratory protection:

Wear a NIOSH-certified (or equivalent) organic vapour/particulate respirator. Do not exceed the maximum use concentration for the respirator facepiece/cartridge combination. For emergency or non-routine, high exposure situations, use a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied-air respirator (SAR) with escape provisions. Observe OSHA regulations for respirator use (29 CFR 1910.134).

Hand protection:

Chemical resistant protective gloves, Consult with glove manufacturer for testing data.

Eye protection:

Tightly fitting safety goggles (chemical goggles). Wear face shield if splashing hazard exists.

Body protection:

Body protection must be chosen depending on activity and possible exposure, e.g. head protection, apron, protective boots, chemical-protection suit.

General safety and hygiene measures:

Work place should be equipped with a shower and an eye wash. Wear protective clothing as necessary to minimize contact. Avoid inhalation of vapors/mists. Wash soiled clothing immediately.

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9. Physical and Chemical Properties

Form:	oily, liquid	
Odour:	camphor-like	
Odour threshold:	0 ppm	
Colour:	colorless to slightly yellow	
pH value:	approx. 6.6	(60 g/l, 20 °C)
Melting point:	-26 °C	
Boiling point:	154.3 °C	(1,013 hPa)
Sublimation point:	No applicable information available.	
Flash point:	44 °C	(closed cup) Literature data.
Flammability:	Flammable.	
Flammability of Aerosol Products:	not applicable, the product does not form flammable aerosols)	
Lower explosion limit:	For liquids not relevant for classification and labelling. The lower explosion point may be 5 - 15 °C below the flash point.	
Upper explosion limit:	For liquids not relevant for classification and labelling.	
Autoignition:	420 °C	Literature data.
Vapour pressure:	7 hPa	(30 °C) (measured)
Density:	0.946 - 0.947 g/cm ³	(20 °C) (DIN 51757)
Relative density:	0.9465	(20 °C) (pycnometer)
Partitioning coefficient n-octanol/water (log Pow):	0.86	(25 °C) (OECD Guideline 107)
Self-ignition temperature:	Based on its structural properties the product is not classified as self-igniting.	
Thermal decomposition:	No decomposition if used as directed.	
Viscosity, dynamic:	2.2 mPa.s	(25 °C) Literature data.
Particle size:	The substance / product is marketed or used in a non solid or granular form.	
Solubility in water:	86 g/l	(20 °C)
Molar mass:	98.14 g/mol	

10. Stability and Reactivity

Reactivity

No hazardous reactions if stored and handled as prescribed/indicated.

Corrosion to metals:

No corrosive effect on metal.

Oxidizing properties:

Based on its structural properties the product is not classified as oxidizing.

Formation of flammable gases:	Remarks:	Forms no flammable gases in the presence of water.
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Chemical stability

The product is stable if stored and handled as prescribed/indicated.

Possibility of hazardous reactions

Reacts with oxidizing agents.

Conditions to avoid

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No data available. Avoid extreme heat. Avoid sources of ignition.

Incompatible materials

strong oxidizing agents, acids, bases

Hazardous decomposition products

Decomposition products:

No hazardous decomposition products if stored and handled as prescribed/indicated., Incomplete combustion results in formation of toxic gases, containing mainly carbon monoxide and carbon dioxide.

Thermal decomposition:

No decomposition if used as directed.

11. Toxicological information

Primary routes of exposure

Routes of entry for solids and liquids are ingestion and inhalation, but may include eye or skin contact. Routes of entry for gases include inhalation and eye contact. Skin contact may be a route of entry for liquefied gases.

Acute Toxicity/Effects

Acute toxicity

Assessment of acute toxicity: Of moderate toxicity after single ingestion. Of moderate toxicity after short-term inhalation. Of moderate toxicity after short-term skin contact.

Oral

Type of value: LD50

Species: rat (no data)

Value: approx. 1,890 mg/kg (BASF-Test)

An aqueous solution was tested.

Inhalation

Type of value: LC0

Species: rat (male/female)

Value: > 6.2 mg/l (BASF-Test)

Exposure time: 4 h

The vapour was tested.

Dermal

Type of value: LD50

Species: rabbit (male/female)

Value: > 794 - < 3,160 mg/kg

Assessment other acute effects

No data available.

Irritation / corrosion

Assessment of irritating effects: Skin contact causes irritation. May cause severe damage to the eyes.

Skin

Species: rabbit

Result: Irritant.

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Method: OECD Guideline 404

Eye

Species: rabbit

Result: Risk of serious damage to eyes.

Method: BASF-Test

Sensitization

Assessment of sensitization: Skin sensitizing effects were not observed in animal studies. Human data do not fully exclude a skin sensitizing potential.

Guinea pig maximization test

Species: guinea pig

Result: Non-sensitizing.

Aspiration Hazard

not applicable

Chronic Toxicity/Effects

Repeated dose toxicity

Assessment of repeated dose toxicity: No substance-specific organotoxicity was observed after repeated administration to animals.

Genetic toxicity

Assessment of mutagenicity: No mutagenic effect was found in various tests with bacteria and mammalian cell culture. The substance was not mutagenic in a test with mammals.

Carcinogenicity

Assessment of carcinogenicity: In long-term animal studies in which the substance was given in the drinking water in high doses, a carcinogenic effect was observed. Due to the rat-specific mode of action, no carcinogenic effects are expected in man. Hence, the findings are of low relevance for humans. IARC Group 3 (not classifiable as to human carcinogenicity).

Reproductive toxicity

Assessment of reproduction toxicity: The results of animal studies gave no indication of a fertility impairing effect.

Teratogenicity

Assessment of teratogenicity: The substance did not cause malformations in animal studies; however, toxicity to development was observed at high doses that were toxic to the parental animals.

Symptoms of Exposure

Overexposure may cause:., unconsciousness, headache

Medical conditions aggravated by overexposure

Data available do not indicate that there are medical conditions that are generally recognized as being aggravated by exposure to this substance/product. See MSDS section 11 - Toxicological information.

12. Ecological Information

Toxicity

Aquatic toxicity

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Assessment of aquatic toxicity:

Acutely harmful for aquatic organisms. The inhibition of the degradation activity of activated sludge is not anticipated when introduced to biological treatment plants in appropriate low concentrations.

Toxicity to fish

LC50 (96 h) 527 mg/l, Pimephales promelas (Flow through.)

The statement of the toxic effect relates to the analytically determined concentration.

Aquatic invertebrates

EC50 (24 h) 820 mg/l, Daphnia magna (DIN 38412 Part 11, static)

The details of the toxic effect relate to the nominal concentration.

Aquatic plants

EC50 (72 h) 32.9 mg/l (growth rate), Chlamydomonas reinhardtii (other, static)

The statement of the toxic effect relates to the analytically determined concentration.

Chronic toxicity to fish

Study scientifically not justified.

Chronic toxicity to aquatic invertebrates

Study scientifically not justified.

Assessment of terrestrial toxicity

Study scientifically not justified.

Microorganisms/Effect on activated sludge

Toxicity to microorganisms

OECD Guideline 209 aquatic

activated sludge of a predominantly domestic sewage/EC20 (30 min): > 1,000 mg/l

The details of the toxic effect relate to the nominal concentration.

DIN 38412 Part 8 aquatic

bacterium/EC0 (16 h): 180 mg/l

Persistence and degradability

Assessment biodegradation and elimination (H₂O)

Readily biodegradable (according to OECD criteria).

Elimination information

> 90 % BOD of the ThOD (28 d) (OECD 301F; ISO 9408; 92/69/EEC, C.4-D) (aerobic, activated sludge, domestic) Readily biodegradable (according to OECD criteria).

87 % BOD of the ThOD (14 d) (OECD 301C; ISO 9408; 92/69/EEC, C.4-F) (aerobic, Inoculum conforming to MITI requirements (OECD 301C)) Readily biodegradable (according to OECD criteria).

Assessment of stability in water

According to structural properties, hydrolysis is not expected/probable.

Bioaccumulative potential

Bioaccumulation potential

Because of the n-octanol/water distribution coefficient (log Pow) accumulation in organisms is not to be expected.

Mobility in soil

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Assessment transport between environmental compartments

The substance will not evaporate into the atmosphere from the water surface.
Adsorption to solid soil phase is not expected.

Additional information

Other ecotoxicological advice:
Do not release untreated into natural waters.

13. Disposal considerations

Waste disposal of substance:

Do not discharge into waterways or sewer systems without proper authorization. Dispose of in a RCRA-licensed facility. Dispose of in accordance with national, state and local regulations.

Container disposal:

Empty containers with less than 1 inch of residue may be landfilled at a licensed facility. Recommend crushing, puncturing or other means to prevent unauthorized use of used containers. If containers are not empty, they must be disposed of in a RCRA-licensed facility.

RCRA: U057

14. Transport Information

Land transport

USDOT

Hazard class: 3
Packing group: III
ID number: UN 1915
Hazard label: 3
Proper shipping name: CYCLOHEXANONE

Sea transport

IMDG

Hazard class: 3
Packing group: III
ID number: UN 1915
Hazard label: 3
Marine pollutant: NO
Proper shipping name: CYCLOHEXANONE

Air transport

IATA/ICAO

Hazard class: 3
Packing group: III
ID number: UN 1915
Hazard label: 3
Proper shipping name: CYCLOHEXANONE

15. Regulatory Information

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Federal Regulations

Registration status:

Chemical TSCA, US released / listed

EPCRA 311/312 (Hazard categories): Fire; Acute

<u>CERCLA RQ</u>	<u>CAS Number</u>	<u>Chemical name</u>
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5000 LBS
5000 LBS
10 mg/l
10000 mg/kg
1000 mg/kg
100 mg/l
100 LBS
5000 LBS
1 LBS

Reportable Quantity for release: 5,000 lb

State regulations

<u>State RTK</u>	<u>CAS Number</u>	<u>Chemical name</u>
MA, NJ, PA	108-94-1	cyclohexanone

NFPA Hazard codes:

Health : 2 Fire: 2 Reactivity: 0 Special:

Assessment of the hazard classes according to UN GHS criteria (most recent version):

Acute Tox.	4 (oral)	Acute toxicity
Acute Tox.	4 (dermal)	Acute toxicity
Acute Tox.	4 (Inhalation - vapour)	Acute toxicity
Eye Dam./Irrit.	1	Serious eye damage/eye irritation
Skin Corr./Irrit.	2	Skin corrosion/irritation
Flam. Liq.	3	Flammable liquids
Aquatic Acute	3	Hazardous to the aquatic environment - acute

16. Other Information

DISCLAIMER OF RESPONSIBILITY

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