Product Safety Summary for Cyclohexanone

SUBSTANCE NAME

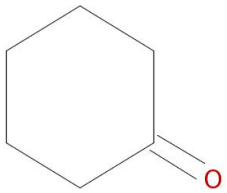
Cyclohexanone
Cyclohexanon
Cyclohexanone (7CI, 8CI, 9CI)
Anon
Anone
Pimelin ketone
Pimelic ketone

GENERAL STATEMENT

Cyclohexanone is a light yellow liquid with an odor that resembles peppermint oil. It is an organic compound that is mainly used as a chemical intermediate for the production of monomers and as a solvent in a range of formulated products for use by professional users and consumers. In general, the health hazards are low, but protection against inhalation, skin and eye contact is required. Cyclohexanone is a flammable liquid and it can be regarded as non-hazardous to the environment.

CHEMICAL IDENTITY

EC Name:	cyclohexanone
EC-No. :	203-631-1
CAS-No. :	108-94-1
Molecular formula:	C6H10O
Structural formula:	



USES AND APPLICATIONS

Cyclohexanone is a light yellow liquid. It is produced by the oxidation of cyclohexane and subsequent treatment of the reaction product. Cyclohexanone is mainly used as an intermediate to produce monomers, particularly for the production of well-known plastics like polyamide. In industrial use, it is also commonly used as intermediate for the manufacturing of fine chemicals. Furthermore it finds application as a laboratory reagent and as a solvent in a wide variety of formulated products, including products for professional uses and consumer products. It is used in formulated products like adhesives, coatings, paints, printing inks and biocidal and plant protection products.

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PHYSICAL CHEMICAL PROPERTIES

Cyclohexanone is a light yellow liquid at room temperature and pressure, with a smell like peppermint oil.

Melting /freezing point: -31 °C at atmospheric pressure
Boiling point/boiling range: 154.3 °C at 1013.25 hPa
Decomposition temperature: Not determined
Flashpoint: 44 °C (closed cup
Flammability (solid, gaseous): Flammable upon ignition
Ignition temperature: 420 °C at 1013 at hPa
Explosion limits:
Lower: 1.05 vol % (air)
Upper: 9.9 vol % (air)
Explosive properties: Not explosive.
Molecular weight: 98.143
pH value: 6.6 at 20 °C
log Pow: 0.86 at 25 °C
Vapor pressure: 7 hPa at 30 °C
Vapor density: Not determined
Relative density: 0.9465 g/cm3 at 20 °C
Dissociation constant: Not applicable
Solubility in/Miscibility with water: 86 g/l at 20 °C
Dynamic viscosity: 2.2 mPa.s at 25 °C
Oxidising properties: No oxidizing properties

HEALTH EFFECTS

Cyclohexanone is moderately hazardous for human health. The acute toxicity via oral and dermal exposure is proved to be low. However, inhalation exposure studies showed some adverse acute effects, sufficient enough to classify it as hazardous. Also irritation and corrosivity studies showed adverse effects on the skin and in the eyes. On the other hand, the results of oral repeated dose testing give no rise to concern. Mutagenicity tests, in vitro and in vivo, were negative as well as carcinogenicity, fertility and reproductive toxicity studies. Cyclohexanone is a flammable liquid and care needs to be taken to avoid the risks of this inherent hazard property when handling Cyclohexanone in pure form or in high concentrations.

EFFECT ASSESSMENT	RESULT
Acute Toxicity (oral/dermal/inhalation)	Cyclohexanone has a low acute toxicity for oral and dermal exposure but inhalation exposure studies suggest that it needs to be considered harmful for that exposure route.
Irritation/Corrosivity (skin/eye/respiratory tract)	Cyclohexanone is irritating and corrosive to the skin and to the eyes.
Sensitization (skin/respiratory tract)	Based on the available data, Cyclohexanone is not considered to have skin or respiratory sensitization properties.
Repeated Dose Exposure	Test results with oral and intravenous exposure indicate that there is no marked repeated dose toxicity.
Mutagenicity	All available test data indicates that Cyclohexanone does not cause mutagenic effects.
Carcinogenicity	Oral carcinogenicity study data suggests that Cyclohexanone is not carcinogenic.
Reproductive Toxicity	All available data suggest that Cyclohexanone has no adverse fertility or reproductive effects.

ENVIRONMENTAL EFFECTS

Based on the values of the octanol water partition coefficient and Henry's constant, Cyclohexanone distributes mainly into water and air. Cyclohexanone's toxicity to aquatic species is low. It is also readily biodegradable and has a low bioaccumulation potential. Also, since the overall toxicity of cyclohexanone is low, it can be concluded that it is not hazardous to the environment or to humans through environmental exposure.

EFFECT ASSESSMENT	RESULT
Aquatic Toxicity	Studies indicate that Cyclohexanone is not toxic to fish and to daphnia and has a low toxicity to algae and aquatic plants.

FATE AND BEHAVIOR	RESULT
Biodegradation	Cyclohexanone is readily biodegradable in water. Biodegradability in soil and sediment is not relevant.
Bioaccumulation potential	Basing on its logPow value, significant accumulation of Cyclohexanone in organisms is not expected.
PBT/vPvB conclusion	Regarding all available data on biotic and abiotic degradation, bioaccumulation and toxicity, it can be stated that the substance does not fulfill the PBT criteria nor the vPvB criteria.

EXPOSURE

Human Health
Exposure can occur to workers in industrial facilities where Cyclohexanone is produced, stored, handled or processed. Professional users or consumers may come into contact with Cyclohexanone through commonly used formulated products, such as adhesives, coatings, paints, printing inks and biocidal and plant protection products. Based on the physical properties of Cyclohexanone skin contact and inhalation are the most likely routes of exposure. Consumer applications are such that consumer exposure will typically be infrequent, for brief periods or in small quantities. Therefore the use of Cyclohexanone by the consumer is not considered to pose a health risk. However, the level of exposure to professional and industrial users may be such that risk management measures must be taken.

Environment
The probability of release of Cyclohexanone in concentrated form to any of the environmental compartments is low under normal industrial use conditions. Also the environmental release of Cyclohexanone from formulated products will be insignificant under normal use conditions. Cyclohexanone is readily biodegradable; therefore, accidental release of small quantities to waste water or surface water should not cause further environmental exposure.

RISK MANAGEMENT RECOMMENDATIONS

Cyclohexanone poses some risks that need to be managed. Exposure via inhalation, skin and eye contact must be avoided, specifically by industrial users and certain professional users. The exposure levels of consumers are low; therefore, typical consumer uses do not require specific risk management measures.
Personnel handling the substance need to be trained in the safe use of Cyclohexanone and workers who may be exposed to it need to be protected by taking adequate measures to protect against chemical exposure. Respiratory protection devices with organic gas filters must be worn, as well as protective clothing, gloves and tightly fitting safety goggles.

Also the flammability of Cyclohexanone poses risks that need to be carefully managed, so risk management needs to focus also on fire prevention. Workers should be properly informed about the risks and trained in the prevention and protection measures to be adopted. Containers and equipment containing Cyclohexanone should be correctly labeled clearly indicating its flammability hazard. Operations involving the possible release of liquid or vapor should be carried out using closed processes or, failing this, in well-ventilated areas or in installations with local extraction systems. The creation and accumulation of static discharge during transfer of the substance should be controlled by precautionary measures such as grounding and bonding containers and equipment. For environmental protection in case of accidental release: do not allow product to reach sewage system or any water course. Retain and dispose of contaminated wash water.

STATE AGENCY REVIEW

This substance has been registered under REACH (EC) No. 1907/2006.
Cyclohexanone is included in the OECD list of High Production Volume (HPV) chemicals.
Cyclohexanone is listed in the following Chemical Inventories: AICS, ENCS, EINECS, NZIoC, DSL Canada, IECSC, KECI, TSCA, PICCS.

REGULATORY INFORMATION/CLASSIFICATION AND LABELING

Classification of the substance according to REGULATION (EC) No 1272/2008:

Flammable liquid:	Flammable liquid Category 3; H226 Flammable liquid and vapour.
Acute toxicity:	Category 4; Oral; H302 Harmful if swallowed.
Acute toxicity:	Category 4; Dermal; H312 Harmful in contact with skin.
Acute toxicity:	Category 4; Inhalation; H332 Harmful if inhaled.
Skin/Eye (Corrosion/irritation):	Skin Irritation Category 2; H315 Causes skin irritation. Eye Damage Category 1; H318 Causes serious eye damage.

Labeling according to REGULATION (EC) No 1272/2008:

Pictogram:

Signal word: Danger

Hazard statements:
H226: Flammable liquid and vapour.
H302: Harmful if swallowed.
H312: Harmful in contact with skin.
H332: Harmful if inhaled.
H315: Causes skin irritation.
H318: Causes serious eye damage.

CONTACT INFORMATION WITHIN COMPANY

For further information on this substance or product safety summaries in general, please contact:

Company: UBE Chemical Europe, S.A
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Postal code: 12100
E-mail: sds.ube.eu@ube.es

Additional information can be found at:
http://www.ube.es
http://www.icca-chem.org/en/Home/ICCA-initiatives/global-product-strategy/

GLOSSARY

Acute toxicity	Harmful effect resulting from a single or short term exposure to a substance.
AICS	Australian Inventory of Chemical Substances.
Biodegradation	Decomposition or breakdown of a substance under natural conditions (actions of micro-organisms etc).
Bioaccumulation	Progressive accumulation in living organisms of a chemical substance present in the environment.
Canadian DSL	Domestic Substances List of Canada.
Carcinogenicity	Substance effects causing cancer.
CAS	Chemical Abstracts Service (division of the American Chemical Society).
Chronic toxicity	Harmful effect after repeated exposures or long term exposure to a substance.
EINECS	European Inventory of Existing Commercial Chemical Substances
ENCS	Existing Notified Chemical Substances (Japan).
Flash point	The lowest temperature at which vapor of the substance may form an ignitable mixture with air.
Genotoxicity	Substance effect that causes damage to genes, including mutagenicity and clastogenicity.
GHS	Globally Harmonized System of Classification and Labeling of Chemicals
HPV	High Production Volume Chemicals.
Hydrolyze	Undergo hydrolysis; decompose by reacting with water.
IECSC	Inventory of Existing Chemical Substances Produced or Imported in China.
Intermediate	Substance that is manufactured for and consumed in or used for chemical processing in order to be transformed into another substance.
KECI	Korean Existing Chemical Inventory.

Monomer	Means a substance which is capable of forming covalent bonds with a sequence of additional like or unlike molecules under the conditions of the relevant polymer-forming reaction used for the particular process.
Mutagenicity	Substance effect that cause mutation on genes.
NZIoC	New Zealand Inventory of Chemicals
PBT	Persistent, bioaccumulative, toxic chemical.
Persistence	Refers to the length of time a compound stays in the environment, once introduced.
PICCS	Philippine Inventory of Chemicals and Chemical Substances.
Risk Management Measures	Engineering controls, conditions and protective equipment needed to be implemented to ensure that the risks to human health and the environment are adequately controlled.
REACH (EC) No. 1907/2006	European Commission Regulation concerning the Registration, Evaluation, Authorization and Restriction of Chemicals.
REGULATION (EC) No 1272/2008	European Commission Regulation on Classification, Labeling and Packaging of Substances and Mixtures.
Reprotoxicity	Including teratogenicity, embryotoxicity and harmful effects on fertility.
Sensitizing	Allergenic.
Sediment	Topsoil, sand and minerals washed from land into water forming in the end a layer at the bottom of rivers and sea.
TSCA	Toxic Substance Control Act (USA).
Vapor pressure	A measure of a substance's property to evaporate.
vPvB	Very persistent, very bio-accumulative.

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REVISION

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DISCLAIMER

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