

CYCLOHEXANONE

1. Chemical product and company identification

A. Product name : Cyclohexanone
B. Synonym : Cyclohexyl ketone ; Anone ; Hexanon ; Ketoexamethylene ; Pimelic ketone ; Pimelin Ketone
Chemical name : Cyclohexanone
Chemical Formula : C6H10O

C. Manufacturer / Supplier / Distributor Information

RAR Resin & Chemical Industries JLT
11th Floor, Jumeirah Lake Towers, P.O. Box: 47381, Dubai UAE
Tel: +971 4 4356516 / +971 4 4356517 Email: info@rarresin.com
Fax: +971 4 4356518 Website: www.rarresin.com

2. COMPOSITION AND INFORMATION ON INGREDIENTS

Composition	CAS #	% by Weight
Cyclohexanone	108-94-1	100

Toxicological Data on Ingredients : Cyclohexanone : ORAL (LD50) Acute : 1516 mg/ kg [Rat.] 1400 mg/ kg [mouse] DERMAL (LD50) : Acute : 948 mg/ kg [Rabbit]

3. HAZARD IDENTIFICATION

Potential Acute Health Effects:

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly Hazardous in case of skin contact irritant, permeator)

Potential Chronic Health Effects

CARCINOGENIC EFFECTS:

A4 (not classifiable for human or animal.) by ACGIH, 3 (not classifiable for human.) by IARC.

MUTAGENIC EFFECTS:

Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/ or yeast.

TERATOGENIC EFFECTS:

Not Available

DEVELOPMENTAL TOXICITY:

Not Available. The substance may be toxic to kidneys, liver, upper respiratory tract, skin, eyes, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organ damage.

DISCLAIMER

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4 FIRST AID MEASURES

EYE CONTACT:	Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. Get Medical attention.
SKIN CONTACT:	In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get Medical attention.
SERIOUS SKIN CONTACT:	Not available.
INHALATION:	If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get Medical attention.
SERIOUS INHALATION:	Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth- to -mouth resuscitation.
WARNING:	It may be hazardous to the person providing aid to give mouth- to- mouth resuscitation when the inhaled materials toxic, infectious or corrosive. Seek medical attention
INGESTION:	DO NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.
SERIOUS INGESTION:	Not available.

5 FIRE AND EXPLOSION DATA

Flammability of the Product	: Flammable
Auto-Ignition Temperature	: 420 dec C (11 deg F)
Flash Points:	: Closed cup: 43.889 °C (111°F). Open cup: 46°C (114.8°F)
Flammable Limits	: LOWER: 1.1% UPPER: 9.4%
Products of Combustion	: These products are carbon oxides (CO, CO2)
Fire Hazrds in Presence of Various Substances	: Flammable in presence of open flames and sparks, of heat
Explosion Hazards in Presence of Various Substance	: Risks of explosion of the product in presence of mechanical impact Not available. Risks of explosion of the product in presence of static discharge: Not available.
Fire Fighting Media and Instructions	: Flammable liquid, soluble or dispersed in water. SMALL FIRE: use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog. Cool containing vessels with water jet in order to prevent pressure build up, autoignition or explosion.
Special Remarks on Fire Hazards	: Not Available
Special Remarks on Explosion Hazards	: Cyclohexanone forms explosive reaction with nitric acid at 75 °C . Reaction of cyclohexanone with hydrogen peroxide + nitric acid forms an explosive peroxide. Vapors may form explosive mixture with air.

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6 ACCIDENTAL RELEASE MEASURE

SMALL SPILL: Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

LARGE SPILL: Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on MSDS and with local authorities.

7 HANDLING AND STORAGE

PRECAUTIONS: Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/ fumes/ vapor/ spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

STORAGE: Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

8 EXPOSURE CONTROLS/ PERSONAL PROTECTION

ENGINEERING CONTROLS: Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

PERSONAL PROTECTION: Splash goggles. Lab coat. vapor respirator. Be sure to use an approved/ certified respirator or equivalent. Gloves.

PERSONAL PROTECTION IN CASE OF LARGE SPILL: Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self-contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

EXPOSURE LIMITS: TWA: 50 from OSHA 9PEL) [United States] Inhalation TWA : 25 (ppm) from ACGIH (TLV)[United states] SKIN TWA: 100 (mg/m³) from NIOSH [United States] SKIN TWA; 25 (ppm) from NIOSH [United States] SKIN TWA; 100 (mg/m³) from OSHA (PEL) [United States] SKIN TWA : 200 (mg/m³) from OSHA (PEL) [United States] Inhalation: Consult local authorities for acceptable exposure limits.

9 PHYSICAL AND CHEMICAL PROPERTIES

A. Physical state and appearance:	Liquid (Oily, liquid)
B. Odor:	Odor reminiscent of peppermint and acetone
C. Taste:	Not available
D. Molecular Weight:	98.15 g.mole
E. Color:	Colorless
F. pH (1 % soln/ water):	Not Available

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G. Boiling Point:	155.6 °C (3120.1 °F) @ 760 mmHg
H. Melting Point:	-31 °C (-28.8 °F)
I. Critical temperature:	356 °C (672.8 °F)
J. Specific Gravity:	0.9478 (water = 1)
K. Vapor pressure:	0.7 kPa (@ 26.7 °C)
L. Vapor density:	3.4 (Air = 1)
M. Volatility:	Not available
N. Odor Threshold	: 0.88 ppm
O. Ionicity (In Water/Oil Dist. Coeff)	: The product is more soluble in oil; log (oil / water) = 0.8
P. Dispersion Properties	: See solubility in water, diethyl ether, acetone
Q. Solubility	: Soluble in diethyl ether, acetone. Partially soluble in cold water, hot water. Solubility in water : 150 g/l @ 10 deg. C ; 50 g/l @ 30 °C. Soluble in alcohol and other common organic solvents.

10 STABILITY AND REACTIVITY DATA

STABILITY:	The product is stable
INSTABILITY TEMPERATURE:	Not available
CONDITIONS OF INSTABILITY:	Heat, ignition sources, incompatible materials
INCOMPATIBILITY WITH VARIOUS SUBSTANCE:	Reactive with oxidizing agents, acids, alkalis
CORROSIVITY:	Non- corrosive in presence of glass
SPECIAL REMARKS ON REACTIVITY:	Incompatible with amines, nitric acid and other strong acids, strong oxidizing agents (perchlorates, peroxides, permanganates, chlorates, nitrates, chlorine, bromine, fluorine) Cyclohexanone can react vigorously with strong oxidizing materials.
SPECIAL REMARKS ON CORROSIVITY:	Not available.
POLYMERIZATION:	Will not occur.

11 TOXICOLOGY INFORMATION

ROUTES OF ENTRY	Absorbed through skin. Eye contact. Inhalation. Ingestion
TOXICITY TO ANIMALS:	WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50); 1400 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 8000 4 hours [Rat].
CHRONIC EFFECTS OF HUMANS: CARCINOGENIC EFFECTS:	A4 (Not classified for human or animal). by ACGIH,3 (Not classifiable for human.) by IARC.
MUTAGENIC EFFECT:	Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: kidney, liver, upper respiratory tract, skin, eyes, central nervous system (CNS).
OTHER TOXIC EFFECTS ON HUMANS:	Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator)

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SPECIAL REMARKS ON TOXICITY TO ANIMALS:

Lethal Dose / Conc 50% Kill: LD50 [Rat]-Route: Oral; Dose: 1620 ul/kg LD50 [Rabbit] - Route: Skin; Dose: 1 ml/kg

SPECIAL REMARKS ON CHRONIC EFFECTS ON HUMANS:

May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic) materials.

SPECIAL REMARKS ON OTHER TOXIC EFFECTS ON HUMANS:

Acute Potential Health Effects: Skin: Causes irritation. Can be absorbed through the skin with possible systematic effects. Harmful if absorbed through skin. Eyes: Causes eye irritation. Contact produces irritation, tearing, and burning pain. It may cause transient corneal injury. Inhalation: It causes respiratory tract (nose, throat) irritation at airborne concentrations of 50 ppm; and 75 ppm causes marked irritation; and 125 ppm causes significant irritation. Vapors also cause eye irritation or conjunctivitis. Inhalation of vapors or mist can affect respiration, behavior / central nervous system and cause central nervous system depression with nausea, headache, light-headedness, ataxia, somnolence, weakness, dizziness, loss of coordination. It may cause kidney and liver damage. Ingestion: May be harmful if swallowed. It causes gastrointestinal tract irritation with abdominal pain, nausea, vomiting, and diarrhea. It may cause liver and kidney damage. It may affect behavior / central nervous system and cause central nervous system depression characterized by excitement followed by headache, dizziness, drowsiness, nausea and other symptoms similar to inhalation. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Chronic Potential Health Effects: Skin: It can have a defatting effect on the skin. Long term exposure to high concentration of vapors may cause clouding of the eyes. Ingestion or Inhalation: Prolonged or repeated ingestion or inhalation may affect respiration and behaviour / central nervous system with symptoms similar to that of acute inhalation. It may also cause kidney damage and affect metabolism (weight loss)

12 ECOLOGICAL INFORMATION

Ecotoxicity: Ecotoxicity in water (LC50): 527 mg/l 96 hours [Fish (Fathead minnow (Pimephales promelas))].

BOD5 and COD: Not available.

Products of Biodegradation: Possibly hazardous short term degradation products are not likely. However, long term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

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13 DISPOSAL CONSIDERATIONS

Waste Disposal: Waste must be disposed of in accordance with federal, state and local environmental control regulations.

14 TRANSPORT INFORMATION

DOT Classification: CLASS 3: Flammable liquid.
Identification: Cyclohexanone UNNA: 1915 PG: III
Special Provisions for Transport: Not available.

15 OTHER REGULATORY INFORMATION

Federal and State Regulations: Connecticut hazardous material survey.: Cyclohexanone Illinois toxic substances disclosure to employee act: Cyclohexanone Illinois chemical safety act: Cyclohexanone New York release reporting list: Cyclohexanone Massachusetts spill list: Cyclohexanone New Jersey: Cyclohexanone Minnesota: Cyclohexanone Massachusetts RTK: Cyclohexanone Massachusetts spill list: Cyclohexanone New Jersey: Cyclohexanone New Jersey spill list: Cyclohexanone Louisiana spill reporting: Cyclohexanone California Director's List of Hazardous Substances: Cyclohexanone TSCA 8 (b) inventory: Cyclohexanone CECLA: Hazardous substances: Cyclohexanone: 5000 lbs. (2268 kg)

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standards (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):

CLASS B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F). CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):

R10 - Flammable. R20 - Harmful by inhalation. S25 - Avoid contact with eyes.

HMIS (U.S.A.):

Health Hazard: 2
Fire Hazard: 2
Reactivity: 0
Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 1
Flammability: 2
Reactivity: 0
Specific hazard:

Protective Equipment: Gloves. Lab coat. Vapor respirator. Be sure to use an approved / certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

16 Other Information

References: Not available.

Other Special Considerations: Not available.

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