# SAFETY DATA SHEET

Version 6.2
Revision Date 11/15/2019
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## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifiers

Product name : Cyclohexanone

Product Number : C102180
Brand : Sigma-Aldrich
Index-No. : 606-010-00-7
CAS-No. : 108-94-1

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

### 1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 Spruce Street
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

### 1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887

## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

**GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)**

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

### 2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word Danger



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Hazard statement(s)

| | |
|---|---|
| H226 | Flammable liquid and vapour. |
| H302 + H312 + H332 | Harmful if swallowed, in contact with skin or if inhaled. |
| H315 | Causes skin irritation. |
| H318 | Causes serious eye damage. |
| H402 | Harmful to aquatic life. |

Precautionary statement(s)

| | |
|---|---|
| P210 | Keep away from heat/sparks/open flames/hot surfaces. No smoking. |
| P233 | Keep container tightly closed. |
| P240 | Ground/bond container and receiving equipment. |
| P241 | Use explosion-proof electrical/ ventilating/ lighting equipment. |
| P242 | Use only non-sparking tools. |
| P243 | Take precautionary measures against static discharge. |
| P261 | Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray. |
| P264 | Wash skin thoroughly after handling. |
| P270 | Do not eat, drink or smoke when using this product. |
| P271 | Use only outdoors or in a well-ventilated area. |
| P273 | Avoid release to the environment. |
| P280 | Wear protective gloves/ eye protection/ face protection. |
| P301 + P312 + P330 | IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth. |
| P303 + P361 + P353 | IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. |
| P304 + P340 + P312 | IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell. |
| P305 + P351 + P338 + P310 | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor. |
| P332 + P313 | If skin irritation occurs: Get medical advice/ attention. |
| P362 | Take off contaminated clothing and wash before reuse. |
| P370 + P378 | In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish. |
| P403 + P235 | Store in a well-ventilated place. Keep cool. |
| P501 | Dispose of contents/ container to an approved waste disposal plant. |

### 2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

## SECTION 3: Composition/information on ingredients

### 3.1 Substances

| | | |
|---|---|---|
| Formula | : | $C_6H_{10}O$ |
| Molecular weight | : | 98.14 g/mol |
| CAS-No. | : | 108-94-1 |
| EC-No. | : | 203-631-1 |
| Index-No. | : | 606-010-00-7 |

| Component | Classification | Concentration |
|---|---|---|
| **Cyclohexanone** | | |
| | Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Dam. 1; | <= 100 % |



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| | | |
|---|---|---|
| | Aquatic Acute 3; H226, H302, H332, H312, H315, H318, H402 | |

For the full text of the H-Statements mentioned in this Section, see Section 16.

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

**General advice**
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

**If inhaled**
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

**In case of skin contact**
Wash off with soap and plenty of water. Consult a physician.

**In case of eye contact**
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

**If swallowed**
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

### 4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

### 4.3 Indication of any immediate medical attention and special treatment needed
No data available

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

**Suitable extinguishing media**
Dry powder Dry sand

**Unsuitable extinguishing media**
Do NOT use water jet.

### 5.2 Special hazards arising from the substance or mixture
Carbon oxides

### 5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

### 5.4 Further information
Use water spray to cool unopened containers.



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## SECTION 6: Accidental release measures

### 6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

### 6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

### 6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

### 6.4 Reference to other sections

For disposal see section 13.

## SECTION 7: Handling and storage

### 7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

### 7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): 3: Flammable liquids

### 7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

**Components with workplace control parameters**

| Component | CAS-No. | Value | Control parameters | Basis |
|---|---|---|---|---|
| Cyclohexanone | 108-94-1 | TWA | 20 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | Remarks | Upper Respiratory Tract irritation<br>Eye irritation<br>Confirmed animal carcinogen with unknown relevance to humans<br>Danger of cutaneous absorption | | |
| | | STEL | 50 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | | Upper Respiratory Tract irritation | | |



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| | | | | |
|---|---|---|---|---|
| | | Eye irritation<br>Confirmed animal carcinogen with unknown relevance to humans<br>Danger of cutaneous absorption | | |
| | | TWA | 25 ppm<br>100 mg/m3 | USA. NIOSH Recommended Exposure Limits |
| | | Potential for dermal absorption | | |
| | | TWA | 50 ppm<br>200 mg/m3 | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | The value in mg/m3 is approximate. | | |
| | | PEL | 25 ppm<br>100 mg/m3 | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | Skin | | |

**Biological occupational exposure limits**

| Component | CAS-No. | Parameters | Value | Biological specimen | Basis |
|---|---|---|---|---|---|
| Cyclohexanone | 108-94-1 | 1,2-Cyclohexanediol | 80 mg/l | Urine | ACGIH - Biological Exposure Indices (BEI) |
| | Remarks | End of shift at end of workweek | | | |
| | | Cyclohexanol | 8 mg/l | Urine | ACGIH - Biological Exposure Indices (BEI) |
| | | End of shift (As soon as possible after exposure ceases) | | | |

## 8.2 Exposure controls

**Appropriate engineering controls**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**Personal protective equipment**

**Eye/face protection**
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

**Skin protection**
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact



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Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 35 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

| | | |
|---|---|---|
| a) | Appearance | Form: liquid<br>Colour: colourless, to, light yellow |
| b) | Odour | stinging |
| c) | Odour Threshold | No data available |
| d) | pH | ca.7 at 70 g/l at 20 °C (68 °F) |
| e) | Melting point/freezing point | Melting point/range: -47 °C (-53 °F) - lit. |
| f) | Initial boiling point and boiling range | 155 °C 311 °F - lit. |
| g) | Flash point | 43 °C (109 °F) - closed cup |
| h) | Evaporation rate | No data available |
| i) | Flammability (solid, gas) | No data available |
| j) | Upper/lower flammability or explosive limits | Upper explosion limit: 9.4 %(V)<br>Lower explosion limit: 1.1 %(V) |
| k) | Vapour pressure | ca.24 hPa at 50 °C (122 °F) |



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| | | |
|---|---|---|
| | | ca.4.5 hPa at 20 °C(68 °F) |
| l) | Vapour density | No data available |
| m) | Relative density | 0.947 g/cm3 at 25 °C (77 °F) |
| n) | Water solubility | ca.90 g/l at 20 °C (68 °F) |
| o) | Partition coefficient: n-octanol/water | log Pow: 0.86 at 25 °C (77 °F) - Bioaccumulation is not expected. |
| p) | Auto-ignition temperature | No data available |
| q) | Decomposition temperature | No data available |
| r) | Viscosity | No data available |
| s) | Explosive properties | No data available |
| t) | Oxidizing properties | No data available |

**9.2 Other safety information**
No data available

## SECTION 10: Stability and reactivity

**10.1 Reactivity**
No data available

**10.2 Chemical stability**
Stable under recommended storage conditions.

**10.3 Possibility of hazardous reactions**
No data available

**10.4 Conditions to avoid**
Heat, flames and sparks.

**10.5 Incompatible materials**
No data available

**10.6 Hazardous decomposition products**
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

## SECTION 11: Toxicological information

**11.1 Information on toxicological effects**

**Acute toxicity**
LD50 Oral - Rat - male - 1,620 mg/kg
Remarks: (ECHA)
LC50 Inhalation - Rat - male and female - 4 h - > 6.2 mg/l
Remarks: (ECHA)
LD50 Dermal - Rabbit - 1,100 mg/kg
Remarks: (External MSDS)



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**Skin corrosion/irritation**
Skin - Rabbit
Result: irritating - 4 h
(OECD Test Guideline 404)
Repeated or prolonged exposure may cause skin irritation and dermatitis, due to degreasing properties of the product.

**Serious eye damage/eye irritation**
Eyes - Rabbit
Result: Irreversible effects on the eye
Remarks: (ECHA)
Risk of corneal clouding.

**Respiratory or skin sensitisation**

**Germ cell mutagenicity**
Mutagenicity (mammal cell test):
Result: negative
Ames test
Escherichia coli/Salmonella typhimurium
Result: negative

**Carcinogenicity**

| | |
|---|---|
| IARC: | No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| NTP: | No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| OSHA: | No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens. |

**Reproductive toxicity**

**Specific target organ toxicity - single exposure**
Acute oral toxicity - Stomach/intestinal disorders, Risk of aspiration upon vomiting., Aspiration may cause pulmonary oedema and pneumonitis.
Acute inhalation toxicity - In high doses:, Irritation symptoms in the respiratory tract.

**Specific target organ toxicity - repeated exposure**

**Aspiration hazard**

**Additional Information**

Repeated dose toxicity - Rat - male and female - Oral - 2,160 h - No observed adverse effect level - 143 mg/kg
RTECS: GW1050000

Prolonged or repeated exposure to skin causes defatting and dermatitis., Cough, Shortness of breath, Headache, Nausea, Vomiting, Incoordination., Inhalation of high concentrations may cause:, Central nervous system depression, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:
After absorption of large quantities:
Headache, Salivation, Nausea, Vomiting, Dizziness, narcosis, Coma
The following applies to ketones in general: when vapours/aerosols occur, mucosal irritations, coughing, and dyspnoea after inhalation. The absorption of large quantities leads to: CNS depression (narcosis). Repeated skin contact leads to a degreasing effect, with secondary inflammation possible. Toxic effects on the liver and kidneys cannot be



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excluded after high doses. The inhalation of droplets may result in the formation of oedemas in the respiratory tract.
Other dangerous properties can not be excluded.
Handle in accordance with good industrial hygiene and safety practice.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

## SECTION 12: Ecological information

### 12.1 Toxicity

| | |
|---|---|
| Toxicity to fish | flow-through test LC50 - Pimephales promelas (fathead minnow) - 527 - 732 mg/l - 96 h<br>(OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - 800 mg/l - 24 h<br>(DIN 38412) |
| | EC5 - Protozoa - 573 mg/l - 48 h<br>Remarks: (maximum permissible toxic concentration)(IUCLID) |
| Toxicity to algae | IC5 - Scenedesmus quadricauda (Green algae) - 370 mg/l - 8 d<br>Remarks: (IUCLID) |
| | static test EC50 - Chlamydomonas reinhardtii (green algae) - 32.9 mg/l - 72 h<br>Remarks: (ECHA) |
| Toxicity to bacteria | EC5 - Pseudomonas putida - 180 mg/l - 16 h<br>Remarks: (maximum permissible toxic concentration)(Lit.) |
| | static test EC50 - activated sludge - > 1,000 mg/l - 30 min<br>(OECD Test Guideline 209) |

### 12.2 Persistence and degradability

| | |
|---|---|
| Biodegradability | aerobic - Exposure time 14 d<br>Result: 87 % - Readily biodegradable.<br>(MITI test)<br>aerobic - Exposure time 28 d<br>Result: 90 - 100 % - Readily biodegradable.<br>(OECD Test Guideline 301F) |
| Theoretical oxygen demand | 2,608 mg/g<br>((calculated))<br>Remarks: (Lit.) |

### 12.3 Bioaccumulative potential

### 12.4 Mobility in soil

### 12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

### 12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.



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## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**Product**
Offer surplus and non-recyclable solutions to a licensed disposal company. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Contact a licensed professional waste disposal service to dispose of this material.

**Contaminated packaging**
Dispose of as unused product.

## SECTION 14: Transport information

**DOT (US)**
UN number: 1915 Class: 3 Packing group: III
Proper shipping name: Cyclohexanone
Reportable Quantity (RQ): 5000 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

**IMDG**
UN number: 1915 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: CYCLOHEXANONE

**IATA**
UN number: 1915 Class: 3 Packing group: III
Proper shipping name: Cyclohexanone

## SECTION 15: Regulatory information

**SARA 302 Components**
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

**SARA 313 Components**
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

**SARA 311/312 Hazards**
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

**Reportable Quantity** : F003 lbs

**Massachusetts Right To Know Components**
No components are subject to the Massachusetts Right to Know Act.

**Pennsylvania Right To Know Components**

| Cyclohexanone | CAS-No. | Revision Date |
|---|---|---|



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**California Prop. 65 Components**
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

## SECTION 16: Other information

**Further information**
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