



## MATERIAL SAFETY DATA SHEET

<b>NFPA</b>	<b>HMIS</b>	<b>Personal Protective Equipment</b>						
	<table border="1"> <tr> <td>Health Hazard</td> <td>1</td> </tr> <tr> <td>Fire Hazard</td> <td>3</td> </tr> <tr> <td>Reactivity</td> <td>0</td> </tr> </table>	Health Hazard	1	Fire Hazard	3	Reactivity	0	
Health Hazard	1							
Fire Hazard	3							
Reactivity	0							
See Section 8.								

### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

<b>Product code:</b>	C1455
<b>Product Name:</b>	CYCLOHEXANE, REAGENT, ACS
<b>Chemical Name:</b>	Cyclohexane
<b>Synonyms:</b>	Benzene, hexahydro- Hexahydrobenzene Hexamethylene Hexanaphthene Ciclohexano (Spanish)
<b>Recommended use:</b>	Solvent.
<b>CAS #:</b>	110-82-7
<b>Formula:</b>	C6-H12
<b>RTECS #</b>	GU6300000
<b>CI#:</b>	Not available
<b>Supplier:</b>	Spectrum Chemicals and Laboratory Products, Inc. 14422 South San Pedro St. Gardena, CA 90248 (310) 516-8000
<b>Emergency Telephone Number:</b>	CHEMTREC: 1-800-424-9300
<b>Contact Person:</b>	Martin LaBenz (West Coast)
<b>Contact Person:</b>	Chris Terpak (East Coast)

### 2. HAZARDS IDENTIFICATION

#### EMERGENCY OVERVIEW

**DANGER!. EXTREMELY FLAMMABLE.** May cause skin and eye irritation. May cause irritation of respiratory tract.

**Odor:**  
Mild. Sweet. Chloroform-like.  
Petroleum-like.

**Physical state:**  
Liquid.

**Appearance:**  
No information available

**Color:**  
Clear. Colorless.

#### OSHA Regulatory Status

This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

## 2. HAZARDS IDENTIFICATION

### POTENTIAL HEALTH EFFECTS

**Principal Routes of Exposure:**

Ingestion. Skin. Inhalation.

**Acute Potential Health Effects:****Skin Contact:**

May cause skin irritation. It may be absorbed through the skin. If absorbed through skin it may cause systemic effects.

**Eye Contact:**

Contact with eyes may cause irritation.

**Inhalation:**

May cause irritation of respiratory tract. May cause nausea and vomiting. May affect respiration. Inhalation of vapors may cause dizziness or suffocation. May cause central nervous system effects. May affect the liver. May affect the urinary system. May affect eyes/vision. It may affect the brain.

**Ingestion:**

Ingestion may cause gastrointestinal irritation, nausea, vomiting, and diarrhoea. Aspiration hazard if swallowed - can enter the lungs and cause damage. Aspiration into the lungs may cause chemical pneumonitis. May cause central nervous system effects. May affect the liver. It may affect the kidneys.

**Chronic Potential Health Effects:****Component**

Cyclohexane  
110-82-7 (100)

**Carcinogen Status:**

No information available

**Target Organs:**

Skin. Liver. Kidneys. Central nervous system.

**Teratogenic Effects:**

No information available

**Mutagenic Effects:**

May affect genetic material  
Experiments with bacteria and/or yeast have shown mutagenic effects

**Aggravated Medical Conditions:** Pre-existing skin disorders. Impaired respiratory function.

See Section 11 for additional Toxicological Information

### POTENTIAL ENVIRONMENTAL EFFECTS

No information available

## 3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %
Cyclohexane	110-82-7	100

## 4. FIRST AID MEASURES

**General Advice:**

Poison information centres in each State capital city can provide additional assistance for scheduled poisons (13 1126).

<b>Skin Contact:</b>	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes. Get medical attention. If skin irritation persists, call a physician.
<b>Eye Contact:</b>	Flush eye with water for 15 minutes. Get medical attention if irritation occurs.
<b>Inhalation:</b>	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
<b>Ingestion:</b>	Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.
<b>Notes to Physician:</b>	Treat symptomatically

## 5. FIRE-FIGHTING MEASURES

### Flammable Properties

<b>Flashpoint (°C/°F):</b>	-18 to -20 °C/ -0.4 to 4 °F
<b>Tested according to:</b> Closed cup	
<b>Lower Explosion Limit (%):</b>	1.3%
<b>Upper Explosion Limit (%):</b>	8.4%
<b>Autoignition Temperature (°C/°F):</b>	245 °C/473 °F

<b>Suitable Extinguishing Media:</b>	Carbon dioxide (CO <sub>2</sub> ). Dry chemical. Water spray mist or foam.
<b>Unsuitable Extinguishing Media:</b>	Do not use a solid (straight) water stream as it may scatter and spread fire.
<b>Hazardous Combustion Products:</b>	Carbon monoxide; Carbon dioxide
<b>Specific hazards:</b>	Extremely flammable. May be ignited by heat, sparks or flames. Container explosion may occur under fire conditions or when heated. Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks). Fire may produce irritating, corrosive and/or toxic gases.
<b>Special Protective Equipment for Firefighters:</b>	As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear
<b>Specific Methods:</b>	Water mist may be used to cool closed containers. For larger fires, use water spray or fog. Cool containers with flooding quantities of water until well after fire is out.

## 6. ACCIDENTAL RELEASE MEASURES

**Personal Precautions:**

Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. In case of large spill, water spray or vapor suppressing foam may be used to reduce vapors, but may not prevent ignition in closed spaces.

**Environmental Precautions:**

Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Do not let this chemical enter the environment. Prevent entry into waterways, sewers, basements or confined areas. In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

**Methods for Cleaning Up:**

Absorb spill with inert material (e.g. vermiculite, dry sand or earth), then place in a suitable chemical waste container. Clean contaminated surface thoroughly.

## 7. HANDLING AND STORAGE

**Handling****Technical Measures/Precautions:**

Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from incompatible materials.

**Safe Handling Advice:**

Wear personal protective equipment. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Do not breathe vapors or spray mist. Do not ingest. When using do not smoke. Handle in accordance with good industrial hygiene and safety practice.

**Storage****Technical Measures/Storage Conditions:**

Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Keep away from heat and sources of ignition. Store in a segregated and approved area. Store away from incompatible materials.

**Incompatible Products:**

Oxidizing agents. Dinitrogen tetroxide.

## 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Engineering measures to reduce exposure:**

Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

**Personal Protective Equipment****Eye protection:**

Goggles. Safety glasses with side-shields.

**Skin and body protection:**

Chemical resistant apron. Long sleeved clothing. Gloves.

**Respiratory protection:**

Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

**Hygiene measures:**

Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

## National occupational exposure limits

### United States

Components	OSHA	NIOSH	ACGIH	AIHA WHEEL
Cyclohexane - 110-82-7	300 ppm TWA 1050 mg/m <sup>3</sup> TWA	300 ppm TWA 1050 mg/m <sup>3</sup> TWA	100 ppm TWA	None

### Canada

Components	Alberta	British Columbia	Ontario	Quebec
Cyclohexane 110-82-7	100 ppm TWA 344 mg/m <sup>3</sup> TWA	100 ppm TWA	100 ppm TWA	300 ppm TWAEV 1030 mg/m <sup>3</sup> TWAEV

### Australia and Mexico

Components	Australia	Mexico
Cyclohexane 110-82-7	300 ppm STEL 1050 mg/m <sup>3</sup> STEL 100 ppm TWA 350 mg/m <sup>3</sup> TWA	300 ppm TWA 1050 mg/m <sup>3</sup> TWA 375 ppm STEL 1300 mg/m <sup>3</sup> STEL

## 9. PHYSICAL AND CHEMICAL PROPERTIES

**Physical state:**

Liquid.

**Appearance:**

No information available

**Color:**

Clear. Colorless.

**Odor:**

Mild. Sweet. Chloroform-like.  
Petroleum-like.

**Taste**

No information available

**Molecular/Formula weight:**

84.16

**Flash point (°C):**

-18

**Lower Explosion Limit (%):**

1.3%

**Upper Explosion Limit (%):**

8.4%

**Autoignition Temperature (°C/°F):**

245 °C/473 °F

**pH:**

No information available

**Boiling point/range(°C/°F):**

80.7 °C/177.3 °F

**Melting point/range(°C/°F):**

6.47 °C/43.6 °F

**Decomposition temperature(°C/°F):**

No information available

**Specific gravity:**

0.7781

**Density (g/cm<sup>3</sup>):**

0.779-0.784 @ 20 °C

**Bulk density:**

No information available

**Vapor pressure @ 20°C (kPa):**

10.3-12.9

**Vapor density:**

2.98

**Evaporation rate:**

6.1 (butyl acetate = 1)  
2.6 (ether = 1)

**VOC content (g/L):**

778-784

**Odor threshold (ppm):**

25

**Partition coefficient  
(n-octanol/water):**

3.44

**Miscibility:**

Miscible with olive oil

**Solubility:**

Insoluble in water  
Soluble in Ether  
Soluble in alcohol  
Soluble in Acetone

## 10. STABILITY AND REACTIVITY

**Stability:**

Stable at normal conditions

**Conditions to avoid:**

Heat. Ignition sources. Incompatible materials.

<b>Materials to avoid:</b>	Oxidising agents. Dinitrogen tetroxide.
<b>Hazardous decomposition products:</b>	Carbon monoxide. Carbon dioxide. When heated to decomposition it emits acrid smoke and irritating fumes.
<b>Possibility of Hazardous Reactions:</b>	It can react vigorously, violently or explosively with oxidizers When mixed hot with liquid dinitrogen tetraoxide an explosion can result
<b>Polymerization:</b>	Hazardous polymerisation does not occur
<b>Corrosivity:</b>	No information available
<b>Special Remarks on Corrosivity:</b>	No information available

## 11. TOXICOLOGICAL INFORMATION

### Acute Toxicity

#### Component Information

*Cyclohexane - 110-82-7*

**LD50/oral/rat =**

> 5000 mg/kg Oral LD50 Rat

**LD50/oral/mouse =** 813 mg/kg

**LD50/dermal/rabbit =**

> 2000 mg/kg Dermal LD50 Rabbit

**LD50/dermal/rat =** No information available

**LC50/inhalation/rat =**

13.9 mg/L Inhalation LC50 Rat 4 h (LOLI)

> 9500 ppm 4 h (RTECS)

**LC50/inhalation/mouse =** 70000 mg/m<sup>3</sup> 2 h

**Other LD50 or LC50 information =**

No information available

#### Product Information

**LC50/inhalation/rat =**

13.9 mg/L 4 h (LOLI)

> 9500 ppm 4 h (RTECS)

**LC50/Inhalation/mouse =** 70000 mg/m<sup>3</sup> 2 h

**LD50/dermal/rabbit =**

>2000 mg/kg

**LD50/dermal/rat =** No information available

**LD50/oral/rat =** > 5000 mg/kg

**LD50/oral/mouse =** 813 mg/kg

#### Local Effects

**Skin irritation:** May cause skin irritation.

**Eye irritation:** Contact with eyes may cause irritation.

**Inhalation:** May cause irritation of respiratory tract. Inhalation of high concentrations of vapors may cause dizziness or suffocation. May cause nausea, and headache. It may affect respiration (respiratory depression, respiratory paralysis). It may affect behavior/central nervous system (ataxia, general anesthetic, drowsiness). It may affect behavior/central nervous system (convulsions). May affect behavior/central nervous system (central nervous system depression - weakness, lethargy, tremors, narcosis, loss of judgement, loss of consciousness, coma). May affect vision (blurred vision). May affect the brain.

**Ingestion:** Aspiration hazard if swallowed. Aspiration into the lungs can cause chemical pneumonitis. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhoea. It may affect behavior/central nervous system (drowsiness). May affect liver . May affect urinary system (kidneys).

**Sensitization:** No information available

### Chronic Toxicity

**Chronic Toxicity** Prolonged skin contact may defat the skin and produce dermatitis.. Prolonged or repeated inhalation may affect the liver. Prolonged or repeated inhalation may affect the kidneys. Prolonged or repeated ingestion may affect the kidneys. Prolonged or repeated inhalation may cause central nervous system effects.

**Carcinogenic effects:** Not considered carcinogenic

Components	NTP	IARC	OSHA HCS - Carcinogens	ACGIH - Carcinogens	Australia - Prohibited Carcinogenic Substances	Australia - Notifiable Carcinogenic Substances
Cyclohexane	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed

**Mutagenic Effects:** May affect genetic material  
Experiments with bacteria and/or yeast have shown mutagenic effects

**Reproductive Effects:** No information available

**Teratogenic Effects:** No information available

**Target Organs:** Skin. Liver. Kidneys. Central nervous system.

## 12. ECOLOGICAL INFORMATION

### ECOTOXICITY

**Toxicity to terrestrial and aquatic plants and animals:** No information available

**Ecotoxicity effects:** Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**Aquatic toxicity:**

*Cyclohexane* - 110-82-7

**Freshwater Algae Data:**

**Freshwater Fish Species Data:**

500 mg/L EC50 *Desmodesmus subspicatus* 72 h  
23.03 - 42.07 mg/L LC50 *Pimephales promelas* 96 h static 1  
24.99 - 44.69 mg/L LC50 *Lepomis macrochirus* 96 h static 1  
3.96 - 5.18 mg/L LC50 *Pimephales promelas* 96 h flow-through 1  
48.87 - 68.76 mg/L LC50 *Poecilia reticulata* 96 h static 1

**Water Flea Data:**

400 mg/L EC50 *Daphnia magna* 24 h

**Mobility:** It is expected to have moderate mobility based upon estimated Koc.

**Persistence and degradability:** It is highly resistant to biodegradation

**Bioaccumulative potential:** Potential for bioconcentration in aquatic organisms is moderate.

### 13. DISPOSAL CONSIDERATIONS

**Waste from residues / unused products:**

Waste must be disposed of in accordance with Federal, State and Local regulation.

**Contaminated packaging:**

Empty containers should be taken for local recycling, recovery or waste disposal

Components	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
Cyclohexane	None	None	None	U056 Ignitable waste

### 14. TRANSPORT INFORMATION

**DOT**

**UN-No:** UN1145  
**Proper Shipping Name:** Cyclohexane  
**Hazard Class:** 3  
**Packing Group:** II  
**Subsidiary Risk:** Not applicable  
**Marine Pollutant:** No data available  
**ERG No:** 128  
**DOT RQ (lbs):** 1000  
**Symbol(s):** R4

**TDG (Canada)**

**UN-No:** UN1145  
**Proper Shipping Name:** Cyclohexane  
**Hazard Class:** 3  
**Packing Group:** II  
**Subsidiary Risk:** No information available  
**Description:** No information available

**ADR**

**UN-No:** UN1145  
**Proper Shipping Name:** Cyclohexane  
**Hazard Class:** 3  
**Packing Group:** II  
**Subsidiary Risk:** No information available  
**Classification Code:** No information available  
**Description:** No information available  
**CEFIC Tremcard No:** No information available

**IMO / IMDG**

**UN-No:** UN1145  
**Proper Shipping Name:** Cyclohexane  
**Hazard Class:** 3  
**Subsidiary Risk:** No information available  
**Packing Group:** II  
**Description:** No information available  
**IMDG Page:** No information available  
**Marine Pollutant:** No information available



EMS: F-E  
MFAG: No information available  
Maximum Quantity: No information available

#### RID

UN-No: UN1145  
Proper Shipping Name: Cyclohexane  
Hazard Class: 3  
Packing Group: II  
Subsidiary Risk: 3  
Classification Code: No information available  
Description: No information available

#### ICAO

UN-No: UN1145  
Hazard Class: 3  
Proper Shipping Name: Cyclohexane  
Packing Group: II  
Subsidiary Risk: No information available  
Description: No information available

#### IATA

UN-No: UN1145  
Proper Shipping Name: Cyclohexane  
Hazard Class: 3  
Packing Group: II  
Subsidiary Risk: No information available  
ERG Code: 3H  
Description: No information available

## 15. REGULATORY INFORMATION

### International Inventories

Components	U.S. TSCA	Philippines (PICCS)	KOREA KECL	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
Cyclohexane	Present	Present	KE-18562	3-2233	Present	Present	203-806-2

### U.S. Regulations

#### Cyclohexane

Massachusetts RTK: Present  
New Jersey RTK Hazardous Substance List: Present  
New Jersey (EHS) List: Present  
New Jersey - Discharge Prevention - List of Hazardous Substances Present  
Pennsylvania RTK: Environmental hazard  
Pennsylvania RTK - Environmental Hazard List Present  
RI RTK - Hazardous Substances List: Present  
Minnesota - Hazardous Substance List: Present  
New York Release Reporting - List of Hazardous Substances:  
1000 lb RQ  
1 lb RQ  
Louisiana Reportable Quantity List for Pollutants: 1000lbfinal RQ  
454kgfinal RQ  
California Directors List of Hazardous Substances: Present

### California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

#### Chemicals Known to the State of California to Cause Cancer:

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

**Chemicals Known to the State of California to Cause Reproductive Toxicity:**

This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Components	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
Cyclohexane	Not Listed	Not Listed	Not Listed	Not Listed

**CERCLA/SARA**

Components	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting <i>de minimis</i>
Cyclohexane	1000 lb final RQ 454 kg final RQ	None	None	None	1.0 % de minimis concentration

**U.S. TSCA**

Components	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
Cyclohexane	Not Applicable	12/19/1985 12/19/1995

**Canada****WHMIS hazard class:**

B2 Flammable liquid

D2B Toxic materials

**Cyclohexane**

B2 D2B

**Canada Controlled Products Regulation:**

This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	WHMIS Ingredient Disclosure List -
Cyclohexane	1 %

**Inventory**

Components	Canada (DSL)	Canada (NDSL)
Cyclohexane	Present	Not Listed

Components	CEPA Schedule I - Toxic Substances	CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting
Cyclohexane	Not listed	Not listed

**EU Classification****R -phrase(s)**

R11 - Highly flammable.

R38 - Irritating to skin.

R65 - Harmful: may cause lung damage if swallowed.

R67 - Vapors may cause drowsiness and dizziness.

R50/53 - Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

**S -phrase(s)**

S 9 - Keep container in a well-ventilated place.

S16 - Keep away from sources of ignition - No smoking.

S25 - Avoid contact with eyes.

S33 - Take precautionary measures against static discharges.

S60 - This material and its container must be disposed of as hazardous waste.

S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

S62 - If swallowed, do not induce vomiting: seek medical advice immediately and show this container or label.

Components	Classification	Safety Phrases
Cyclohexane	F; R11 Xi; R38 N; R50-53 Xn; R65 R67	S9 S16 S25 S33 S60 S61 S62

The product is classified in accordance with Annex VI to Directive 67/548/EEC

**Indication of danger:**

F - Highly flammable.

Xn - Harmful.

Xi - Irritant.

N - Dangerous for the environment.

**16. OTHER INFORMATION**

The MSDS format complies with ANSI Z400.1-2004 standards.

**Preparation Date** 03-Aug-2011

**Reason for revision:** Not applicable

**Prepared by:** Sonia Owen

**Literature reference:** No information available

All chemicals may pose unknown hazards and should be used with caution. This Material Safety Data Sheet (MSDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this MSDS. The physical properties reported in this MSDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this MSDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.