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## 1. PRODUCT IDENTIFICATION

**Name:** *Cyclohexane*

**Synonyms:** *hexahydrobenzene, benzenehexahydride – both rarely used*

**CAS#** 110-82-7

**Product Uses:** *solvent for oils, fats, waxes, resins; reagent.*

**Supplier Identifier:** *Megaloid Laboratories Limited  
5515 North Service Road, Ste 306  
Burlington, Ontario, Canada  
L7L 6G4  
Phone: 905-337-7411 / Fax: 905-337-1686*

**EMERGENCY INFORMATION** Call CHEMTREC - (800) 424-9300 (CCN # 693764)

## 2. HAZARDS

<i>GHS Class (category)</i>	<i>Flammable (2)</i>	<i>Aspiration (1)</i>	<i>STOT (3)</i>	<i>Acute aquatic (2)</i>
<b>Signal Word</b>	<b>DANGER</b>			
<b>Hazard Statements</b>	<i>highly flammable liquid &amp; vapour (H225)</i>	<i>May be fatal if swallowed &amp; enters airways (H304)</i>	<i>May cause dizziness or drowsiness (H336)</i>	<i>Toxic to aquatic life (H401)</i>



Label Pictograms

### GHS Precautionary Statements for Labelling

#### Prevention

- P210** Keep away from heat, sparks, open flames and hot surfaces. No smoking.
- P240** Ground or bond container and receiving equipment.
- P241** Use explosion-proof electrical, ventilating and lighting equipment.
- P242** Use only non-sparking tools.
- P243** Take precautionary measures against static discharge.

<b>P261</b>	Avoid breathing vapours.
<b>P264</b>	Wash hands thoroughly after handling.
<b>P271</b>	Use only outdoors or in a well-ventilated area.
<b>P273</b>	Avoid release to the environment.
<b>P280</b>	Wear eye protection, protective gloves and clothing of butyl rubber
<b>Response</b>	
<b>P301, P310</b>	IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
<b>P302, P352</b>	IF ON SKIN: Wash with plenty of soap and water.
<b>P303, P361, P353</b>	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower.
<b>P304, P340</b>	IF INHALED : Remove person to fresh air and keep comfortable for breathing.
<b>P312</b>	Call a POISON CENTER or doctor/physician if you feel unwell.
<b>P331</b>	Do NOT induce vomiting.
<b>P332, P313</b>	If skin irritation occurs: Get medical advice/attention.
<b>P362, P364</b>	Take off contaminated clothing and wash it before reuse.
<b>P370, P378</b>	In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish.
<b>P391</b>	Collect spillage.
<b>Storage</b>	
<b>P403 + P235</b>	Store in a well-ventilated place. Keep cool.
<b>P405</b>	Store locked up.
<b>Disposal</b>	
<b>P501</b>	Dispose of contents and container in accordance with local, regional, national and international regulations.

### 3. COMPOSITION

Chemical Name:	CAS No.	%	Other Identifiers
<i>Cyclohexane</i>	<i>110-82-7</i>	<i>100</i>	<i>EC # 203-806-2</i>

### 4. FIRST AID

#### Inhalation

*Remove from contaminated area promptly. CAUTION: Rescuer must not endanger himself! If breathing stops, administer artificial respiration and seek medical aid promptly.*

#### Skin Contact

*Wash with plenty of water. Remove contaminated clothing and do not reuse until thoroughly laundered.*

#### Eye Contact

*Wash eyes with plenty of water, holding eyelids open. Seek medical assistance if there is any irritation.*

#### Ingestion

*Give plenty of water to dilute product. Do not induce vomiting (NOTE below). Keep victim quiet. If vomiting occurs, lower victim's head below hips to prevent inhalation of vomited*

material. Seek medical help promptly.

#### **First-aid Comments**

*Inadvertent inhalation of vomited material may seriously damage the lungs. The danger of this is greater than the risk of poisoning through absorption of this relatively low-toxicity substance. The stomach should only be emptied under medical supervision, and after the installation of an airway to protect the lungs.*

## **5. FIRE FIGHTING & FLAMMABILITY**

### **Extinguishing Media**

#### **Suitable Extinguishing Media**

*foam, dry chemical, water fog or spray only to cool intact containers, product floats on water – water jet spreads flames; firefighters must wear SCBA*

### **Combustion Products**

*carbon monoxide, nitrogen oxides, plus irritating aldehydes, ketones & other substances*

### **Special Protective Equipment and Precautions for Fire-fighters**

*Firefighters must wear SCBA. Fire-fighters may enter the area if positive pressure SCBA and full Bunker Gear is worn.*

### **Static Charge Accumulation**

*readily accumulates static charge on agitation or pumping; **static discharge can cause ignition***

## **6. ACCIDENTAL RELEASE MEASURES**

#### **Serious Fire Potential:**

*blanket spill with foam as a precaution against accidental ignition. Take extreme care to avoid sparks – do not operate (turn on OR off) electrical appliances near spill, unless explosion proof.*

### **Personal Precautions, Protective Equipment, and Emergency Procedures**

*Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.*

### **Environmental Precautions**

*Stop and contain spill/release if it can be done safely. Prevent spilled material from entering sewers, storm drains, other unauthorized drainage systems, and natural waterways. Use foam on spills to minimize vapors Use water sparingly to minimize environmental contamination and reduce disposal requirements. If spill occurs on water notify appropriate authorities and advise shipping of any hazard.*

### **Methods and Materials for Containment and Cleaning Up**

*Leak Precaution: dyke to control spillage and prevent environmental contamination*

*Handling Spill: Ventilate contaminated area; recover free liquid with suitable pumps; absorb residue on an inert sorbent, sweep & pick up using plastic or aluminium shovel, & store in closed containers for recycling or disposal.*

### **Other Information**

*Report spills to local health, safety and environmental authorities, as required.*

## 7. HANDLING & STORAGE

### Precautions for Safe Handling

Only use non-sparking bronze or aluminium hand tools. All electrical & mechanical equipment (including lighting, switchgear and forklift trucks) used with or around this product must be explosion-proof. Always ground or electrically bond the source container, receiving container and transfer pump before transferring contents. Avoid splashing by keeping the product nozzle below the surface in the receiving container. Never cut, drill, weld or grind on or near this container.

Avoid generating or breathing product vapour; if vapour forms in use, install adequate ventilation (see Part 8). If dealing with a spill & ventilation is impossible or impractical, wear a suitable respirator with an organic vapour cartridge. Avoid contact with skin & wash work clothes frequently. An eye bath & safety shower must be available near the workplace.

**WARNING:** *Cyclohexane has a mild, pleasant odour, which may not warn of hazard!*

### WHEN FILLING STORAGE TANKS WITH THIS PRODUCT, IN ADDITION TO NORMAL GROUNDING PROCEDURES, READ THE FOLLOWING:

*This product may form an explosive mixture inside a bulk storage tank. Prior to filling a bulk storage tank with this product, consider ventilating the headspace with nitrogen. In addition, consider asking the supplier to put an anti-static additive in the product when you order. If the bulk tank has a floating product level indicator, this should be inspected regularly. The float **MUST HAVE** a firmly fixed ground wire connecting it to its support cable. This connection must be free of corrosion.*

*For details, consult NFPA 77, 2007: "Recommended Practice on Static Electricity"*

### Conditions for Safe Storage

*Store & use in a cool, dry environment, away from sources of ignition & oxidizing agents.*

## 8. EXPOSURE CONTROL & PERSONAL PROTECTION

Ontario TWAEV 100ppm / 334mg/m<sup>3</sup>  
AGGIH TLV 100ppm / 334mg/m<sup>3</sup>  
OSHA PEL 300ppm / 1050mg/m<sup>3</sup>

Ontario STEV not listed  
ACGIH STEL not listed  
OSHA STEL not listed

<b>Ventilation</b>	<i>product should be used in sealed equipment; mechanical ventilation (explosion-proof) may be required to control airborne titre to regulated limits depending on handling procedure; make available respirators with organic vapour cartridges available for "escape" should ventilation fail; store respirators in air-tight containers (eg: "Tupperware" or "ZipLock") to preserve cartridge "freshness"</i>
<b>Hands</b>	<i>Nitrile or "Viton" gloves recommended – other types may also protect; consult supplier to confirm suitability.</i>
<b>Eyes</b>	<i>Safety glasses with side shields – always protect the eyes</i>
<b>Clothing</b>	<i>No special protective clothing required</i>

### Appropriate Engineering Controls

*The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider: Local ventilation should be provided. Use explosion-proof ventilation equipment to stay below exposure limits.*

## 9. PHYSICAL PROPERTIES

<b>Appearance</b>	<i>Clear colourless liquid.</i>
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<b>Odour</b>	<i>pleasant gasoline-like odour</i>
<b>Odour threshold</b>	<i>10-750ppm – huge range for detection; odour is an unreliable guide to hazard</i>
<b>pH</b>	<i>none – does not liberate hydrogen ions when dissolved</i>
<b>Melting Point/Freezing Point</b>	<i>6.6°C / 44°F, also 6.5°C / 44°F</i>
<b>Initial Boiling Point/Range</b>	<i>81°C / 177°F</i>
<b>Flash Point</b>	<i>-20°C / -4°F (closed cup)<sup>1</sup>; also -18°C / -1°F<sup>1</sup> &amp; other higher values</i>
<b>Evaporation Rate</b>	<i>5.6 (Butyl Acetate =1)</i>
<b>Flammability ( Solid, Gas)</b>	<i>Not Available</i>
<b>Upper/Lower Flammability or Explosive Limit</b>	<i>1.3% – 8.4% <b>NOTE: Saturated vapour at 20°C &amp; higher is above the upper flammable limit.</b></i>
<b>Vapour Pressure</b>	<i>77mmHg / 10.3kPa (20°C / 68°F), also 93.3mmHg / 12.4kPa</i>
<b>Vapour Density (air = 1)</b>	<i>2.9</i>
<b>Relative Density (water = 1)</b>	<i>0.78</i>
<b>Water Solubility</b>	<i>5.5milligrams/litre (20°C / 68°F), also 80mg/litre (25°C / 77°F) – virtually water-insoluble Also soluble in most organic solvents</i>
<b>Partition Coefficient, n-Octanol/Water (Log Kow)</b>	<i>3.44</i>
<b>Auto-ignition Temperature</b>	<i>245°C – 260°C / 473°F – 500°F</i>
<b>Conversion Factor</b>	<i>1 ppm = 3.44g/m<sup>3</sup></i>
<b>Viscosity</b>	<i>1.0 centipoise (20°C / 68°F)</i>
<b>Physical State</b>	<i>Liquid</i>
<b>Molecular Weight</b>	<i>84 grams per mole</i>
<b>Molecular Formula</b>	<i>C6H12</i>

## 10. REACTIVITY

**Dangerously Reactive** *with strong oxidising agents; liquid NO<sub>2</sub> added to hot cyclohexane causes explosions . . .*

**Also Reactive** *with - none known*

### **Chemical Stability**

*stable; will not polymerize*

### **Possibility of Hazardous Reactions**

*Under normal conditions of storage and use, hazardous reactions will not occur.*

## Conditions to Avoid

Reactive or incompatible with the following materials: oxidizing materials

## Mechanical Impact

not sensitive

## 11. TOXICITY

Acute Toxicity	
<b>LD<sub>50</sub> (oral)</b>	>5000mg/litre (rat, no mortality) 1, 6200, 12,850 & 30,400mg/kg (rat), 5500mg/kg (rabbit)
<b>LD<sub>50</sub> (skin)</b>	>2000mg/kg (rabbit) – no mortality, no adverse symptoms reported
<b>LC<sub>50</sub> (inhalation)</b>	>5540 & >9500ppm (rat) – no mortality, >8560ppm (mouse) – no mortality

### Skin Corrosion/Irritation

degreasing – slightly irritating, but little to no effect on intermittent contact

### Serious Eye Damage/Irritation

liquid slightly irritating; vapour irritating above 300ppm.

### STOT (Specific Target Organ Toxicity) - Single Exposure

#### Inhalation

irritating above 250ppm; low toxicity; high concentrations cause headache, dizziness, drowsiness, intoxication

#### Skin Absorption

yes, but very low toxicity by this route.

#### Ingestion

as for inhalation, plus nausea & (temporary) laxative effect

### STOT (Specific Target Organ Toxicity) - Repeated Exposure

Do not breathe vapours. If inhaled remove person to fresh air and keep comfortable for breathing.

#### Respiratory and/or Skin Sensitization

not a sensitiser in humans or animals.

#### Carcinogenicity

not considered a tumorigen or a carcinogen in humans or animals according to NTP, IARC or ACGIH

#### Reproductive Toxicity

Inadequate information available. Two-generation reproduction and developmental toxicity studies using rats and rabbits exposed (whole-body) to atmospheric concentrations up to 7000 ppm cyclohexane did not detect evidence of developmental toxicity in either species.

#### Germ Cell Mutagenicity

Not expected to cause heritable genetic effects.

## 12. ECOLOGICAL INFORMATION

<b>Bioaccumulation</b>	cyclohexane is not a bioaccumulator; in any case, rapid volatility & buoyancy (floats on water) limit bioaccumulation
<b>Persistence and Degradability</b>	<b>Biodegradation -</b> biodegradation data for cyclohexane is highly variable; from 10% in 10hr to highly resistant to biological attack; in one study, 45% biodegradation was seen in 8 days when cyclohexane was added to

	gasoline & observed; also 77% in 28 days, rapid volatilization from soil or water limits opportunity for biodegradation
	<b>Abiotic Degradation -</b> reacts with atmospheric hydroxyl radicals; estimated ½-life in air is 45hr, 52hr & 15hr
<b>Mobility in soil, water</b>	water insoluble, but moderately mobile in soil & water
<b>Aquatic Toxicity</b>	
<b>LC50 (Fish, 96hr)</b>	4.5, 93-117mg/litre ( <i>Pimephales promelas</i> ), 57.7mg/litre ( <i>Poecilia reticulata</i> ), 9mg/litre ( <i>Oryzias latipes</i> ) 55mg/litre ( <i>Leuciscus idus</i> , 48hr) & others
<b>EC50 (Crustacea, 24hr)</b>	0.9, 2.4 & 3.8mg/litre ( <i>Daphnia magna</i> , 48hr) <sup>1</sup> , 135mg/litre ( <i>Daphnia magna</i> , 96hr)
<b>EC50 (Algae)</b>	38mg/litre ( <i>Chlamidomonas</i> sp.), 32mg/litre ( <i>Chlorella vulgaris</i> ), 3.4 & 9.3mg/litre ( <i>Pseudokirchnerella subcapitata</i> ), >500mg/litre ( <i>Scenedesmus subspicatus</i> )
<b>EC50 (Bacteria)</b>	97mg/litre ( <i>Nitrosomonas</i> sp.), 200mg/litre ( <i>Photobacterium phosphoreum</i> ), 29mg/litre (mixed microbial culture)

### 13. DISPOSAL

#### Water Disposal

Do not flush to sewer, recycle solvent if possible, may be incinerated in approved facility

#### Containers

**Drums** should be reused. Recondition and pressure test by a licensed reconditioner prior to re-use.


**Pails** must be vented and thoroughly dried prior to crushing and recycling.

**IBCs** (intermediate bulk containers): polyethylene bottle must be pressure tested & recertified at 30 months. Replace at 60 months (5yrs).

**Steel containers** must be inspected, pressure tested & recertified every 5 years.

**Never cut, drill, weld or grind on or near this container,  
even if empty**

### 14. TRANSPORT CLASSIFICATION

<b>Canada TDG</b>	<b>PIN</b>	UN1145	
<b>AND</b>	<b>Shipping Name</b>	Cyclohexane	
<b>U.S.A. 49 CFR</b>	<b>Class &amp; Packing Group</b>	3, PG II	
<b>Marine Pollutant ERAP Required Reportable Quantity E R G No.</b>	Not a Marine Pollutant NO 1000lbs (454kg) 129		

### 15. REGULATIONS

<b>Canada DSL</b>	On Inventory
<b>U.S.A. TSCA</b>	On Inventory

## U.S.A. Regulations

**Immediately Dangerous to Life or Health:** 1300 ppm

**Allowable Tolerances:** Residues of cyclohexane are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Use: solvent, cosolvent.

**OSHA Standards:** Permissible Exposure Limit: Table Z-1 8-Hr Time Weighted Avg: 300 ppm (1050 mg/cu m).

**NIOSH Recommendations:** Recommended Exposure Limit: 10 Hour Time-Weighted Average: 300 ppm (1050 mg/cu m).

**Threshold Limit Values:** 8 hr Time Weighted Avg (TWA): 100 ppm. Excursion Limit

Recommendation: Excursions in worker exposure levels may exceed 3 times the TLV-TWA for no more than a total of 30 minutes during a work day, and under no circumstances should they exceed 5 times the TLV-TWA, provided that the TLV-TWA is not exceeded.

**Atmospheric Standards:** This action promulgates standards of performance for equipment leaks of Volatile Organic Compounds (VOC) in the Synthetic Organic Chemical Manufacturing Industry (SOCMI). The intended effect of these standards is to require all newly constructed, modified, and reconstructed SOCMI process units to use the best demonstrated system of continuous emission reduction for equipment leaks of VOC, considering costs, non air quality health and environmental impact and energy requirements. Cyclohexane is produced, as an intermediate or a final product, by process units covered under this subpart.

**Clean Water Act Requirements:** Cyclohexane is designated as a hazardous substance under section 311(b)(2)(A) of the Federal Water Pollution Control Act and further regulated by the Clean Water Act Amendments of 1977 and 1978. These regulations apply to discharges of this substance. This designation includes any isomers and hydrates, as well as any solutions and mixtures containing this substance.

**CERCLA Reportable Quantities:** Persons in charge of vessels or facilities must notify the National Response Center (NRC) immediately, when there is a release of this designated hazardous substance, in an amount equal to or greater than its reportable quantity of 1000lb (454kg). The toll free number of the NRC is (800) 424-8802. The rule for determining when notification is required is stated in 40 CFR 302.4 (section IV. D.3.b).

**TSCA Requirements:** Pursuant to section 8(d) of TSCA, EPA promulgated a model Health and Safety Data Reporting Rule. The section 8(d) model rule requires manufacturers, importers, and processors of listed chemical substances and mixtures to submit to EPA copies and lists of unpublished health and safety studies. Cyclohexane is included on this list. Effective date: 12/19/85; Sunset date: 12/19/95.

**RCRA Requirements:** As stipulated in 40 CFR 261.33, when cyclohexane, as a commercial chemical product or manufacturing chemical intermediate or an off-specification commercial chemical product or a manufacturing chemical intermediate, becomes a waste, it must be managed according to Federal and/or State hazardous waste regulations. Also defined as a hazardous waste is any residue, contaminated soil, water, or other debris resulting from the cleanup of a spill, into water or on dry land, of this waste. Generators of small quantities of this waste may qualify for partial exclusion from hazardous waste regulations (40 CFR 261.5).

**FIFRA Requirements:** Residues of cyclohexane are exempted from the requirement of a tolerance when used in accordance with good agricultural practice as inert (or occasionally active) ingredients in pesticide formulations applied to growing crops only. Use: solvent, cosolvent.

**FDA Requirements:** Cyclohexane may be used in inks for marking food supplements in tablet form, gum, and confectionery. Restrictions: no residue. Cyclohexane is an indirect food additive for use only as a component of adhesives.

### **SARA 302/304 Composition/information on ingredients**

**SARA 304 RQ :** Not applicable.

**SARA 311/312 Classification :**

FLAMMABLE LIQUIDS - Category 2, SKIN IRRITATION - Category 2, SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3, ASPIRATION HAZARD - Category 1



## State regulations

**Massachusetts:** The following components are listed: cyclohexane

**New York:** The following components are listed: Cyclohexane; Benzene, hexahydro-

**New Jersey:** The following components are listed: cyclohexane

**Pennsylvania:** The following components are listed: cyclohexane

**California Prop. 65 Clear and Reasonable Warnings (2018)**

WARNING: This product can expose you to Benzene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. This product can expose you to Toluene, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to [www.P65Warnings.ca.gov](http://www.P65Warnings.ca.gov).

## International Regulations

**Australia:** All components are listed or exempted.

**China:** All components are listed or exempted.

**Japan:** All components are listed or exempted.

**Japan inventory (ISHL):** Not determined.

**Republic of Korea :** All components are listed or exempted.

**Malaysia:** All components are listed or exempted.

**New Zealand:** All components are listed or exempted.

**Philippines:** All components are listed or exempted.

**Taiwan:** All components are listed or exempted.

**Turkey:** Not determined.

**Thailand:** Not determined.

**Viet Nam:** Not determined.

## 16. OTHER INFORMATION

<b>NFPA RATING</b>	<b>Health 1</b>	<b>Flammability 3</b>	<b>Instability 0</b>
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Prepared for Megaloid Laboratories Limited by Richard Koscher

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Revision Dates: July 2006, Nov 2008, Nov 2011, Nov 2014, July 2017, January 2019

<b>Key to Abbreviations</b>	ACGIH® = American Conference of Governmental Industrial Hygienists AIHA® = AIHA® Guideline Foundation HSDB® = Hazardous Substances Data Bank IARC = International Agency for Research on Cancer NFPA = National Fire Protection Association NIOSH = National Institute for Occupational Safety and Health NIOSH = National Institute for Occupational Safety and Health NTP = National Toxicology Program OSHA = US Occupational Safety and Health Administration RTECS® = Registry of Toxic Effects of Chemical Substances
<b>References</b>	CHEMINFO database. Canadian Centre for Occupational Health and Safety (CCOHS). HSDB® database. US National Library of Medicine. Available from Canadian Centre for Occupational Health and Safety (CCOHS). NIOSH Pocket Guide database. National Institute for Occupational Safety and Health. Available from Canadian Centre for Occupational Health and Safety (CCOHS). Registry of Toxic Effects of Chemical Substances (RTECS®) database. Dassault Systèmes/BIOVIA ("BIOVIA"). Available from Canadian Centre for Occupational Health and Safety (CCOHS).
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