SAFETY DATA SHEET

TEDIA®
High Purity Solvents

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CYCLOHEXANE

SDS No. M0044

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: Cyclohexane
Synonyms: Hexahydrobenzene; hexamethylene; Hexanaphthene
Recommended Use: This product is recommended for laboratory and manufacturing use only. It is not recommended for drug, food or household use.

2. HAZARDS IDENTIFICATION

Classification:
Flammable Liquids: GHS Category 2
Skin Irritation: GHS Category 2
Specific Target Organ Toxicity, Single Exposure: GHS Category 3
Aspiration Hazard: GHS Category 1
Acute Aquatic Toxicity: GHS Category 1

Label Elements
Signal Word: DANGER!
Hazard Statements:

H225 – Highly flammable liquid and vapor.
H304 – May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H336 – May cause drowsiness or dizziness.
H400 – Very toxic to aquatic life.

Precautionary Statements:

P210 – Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
P243 – Take precautionary measures against static discharge.
P280 – Wear protective gloves/protective clothing/eye protection/face protection.
P303+P361+P353 – IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304+P340+P312 – IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.

P305+P351+P338 – IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do – continue rinsing.
P403+P233 – Store in a well-ventilated place. Keep container tightly closed.
P501 – Dispose of contents/ container to an approved waste disposal plant.

Emergency Overview
Breathing vapors may cause drowsiness and dizziness. Aspiration hazard. Causes irritation to skin eyes and respiratory tract. Highly flammable liquid and vapor. Vapor may cause flash fire. Target Organs: Central nervous system, and skin.

HMIS Rating:
Health – 2* Flammability – 3 Physical Hazard – 0 PPE – User supplied
NOTE: HMIS ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. These ratings are based on the inherent properties of this chemical under expected conditions of normal use and are not intended to be used in emergency situations. PPE is determined by the user based on their needs and conditions.

3. COMPOSITION AND INFORMATION ON INGREDIENTS

Ingredient	CAS No	Percent	Hazardous
Cyclohexane	110-82-7	100%	Yes

4. FIRST-AID MEASURES

Inhalation: If inhaled, remove to fresh air. If breathing is labored or with coughing, give 100% supplemental oxygen. If not breathing, begin artificial respiration. Get medical aid.
Ingestion: Aspiration hazard. Get medical aid. Do not induce vomiting unless directed by medical personnel. Never give anything by mouth to an unconscious person. If not breathing, begin artificial respiration.
Skin Contact: Immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Wash clothing before reuse. Thoroughly clean shoes before reuse.
Eye Contact: Check for and remove contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.
Notes to Physician: Treat symptomatically and supportively.

5. FIRE FIGHTING MEASURES

Flammability: Highly flammable liquid and vapor (GHS Category 2)
Auto-ignition Temperature: 255° C (473° F)
Flash Point: -20° C (-7.6° F)
Flammable Limits: Lower Limit – 1.3 vol %, Upper Limit – 8.0 vol %
Products of Combustion: Will decompose into highly toxic and irritating gases (carbon monoxide and carbon dioxide) under fire conditions.
Specific Fire Hazards: As in any fire, always wear self-contained breathing apparatus in pressure-demand (MSA/NIOSH approved or equivalent), and full protective gear. May accumulate static electric charge and may cause ignition of its own vapors. Use water spray to keep fire exposed containers cool. Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Vapors are heavier than air and may travel to a source of ignition and flash back. Vapors can spread along the ground and collect in low or confined areas. Material floats on water and may travel to a source of ignition and spread fire.
Specific Explosion Hazards: Containers may explode in the heat of a fire.
Fire Fighting Media: Water may be ineffective. Material is lighter than water and insoluble in water. Fire could easily be spread by use of water where run-off cannot be contained. Do not use straight streams of water. Use dry chemical, carbon dioxide, or appropriate foam. Solid streams of water may be ineffective and spread material. For large fires, use water spray, fog, or regular foam. For small fires, use dry chemical, carbon dioxide, water spray, or regular foam. Cool containers with flooding quantities of water until well after the fire is out.
National Fire Protective Association: Health - 1, Flammability - 3, Reactivity - 0

NOTE: NFPA ratings use a numbering scale that ranges from 0 - 4 to indicate the degree of hazard. A value of zero means the chemical presents no hazard while a value of four indicates a high hazard. They are for use by emergency personnel to address the hazards that are presented by short term, acute exposure to this product under fire, spill, or similar emergencies. Ratings involve data and interpretations that may vary from company to company.

6. ACCIDENTAL RELEASE MEASURES

Absorb spilled liquid with sorbent pads, socks, or other inert material such as vermiculite, sand, or earth. Provide ventilation to the affected area and remove all ignition sources. Avoid run-off into storm sewers and ditches that lead to waterways. Approach the spill from upwind and pick up absorbed material and place it in a suitable container. Use only non-sparking tools and equipment. A vapor suppressing foam may be used. Always use proper personal protective equipment as described in section 8.

7. HANDLING AND STORAGE

Precautions: Always use proper personal protective equipment as described in section 8. Wash thoroughly after handling. Ground and bond containers when transferring material. Avoid contact with eyes, skin, and clothing. Remove contaminated clothing and wash before reuse. Empty containers contain product residue (liquid and vapor) and can be dangerous. Keep container tightly closed and away from heat, spark, and flame. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks, or open flames. Use with adequate ventilation. Avoid breathing vapor or mist.
Storage: Keep in a flammables area away from all sources of ignition and oxidizing materials. Keep in a tightly closed container. Store in a cool, dry, well-ventilated area away from incompatible substances. Protect from moisture.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls: Use explosion-proof ventilation equipment. Facilities storing or using the material should be equipped with eyewash station and a safety shower. Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Personal Protection: Wear protective chemical goggles or appropriate eye protection. Use appropriate protective gloves and protective clothing to prevent skin exposure. A respiratory protection program that meets OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever possible. Always use a NIOSH or European Standard EN 149 approved respirator when necessary.
Exposure Limits:

ACGIH – 100 ppm TWA
NIOSH – 300 ppm TWA; 1050 mg/m^3 TWA; 1300 ppm IDLH
OSHA Final PELs – 300 ppm TWA; 1050 mg/m^3 TWA

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State and Appearance: Clear, colorless liquid.
Odor: sweetish, chloroform-like odor
Odor Threshold: 300 ppm
Molecular Formula: C_6H_{12}
Molecular Weight: 84.16
Auto-ignition Temperature: 255^o C (473^o F)
Flash Point: -20^o C (-7.6^o F)
Flammable Limits: Lower Limit – 1.3 vol %, Upper Limit – 8.0 vol %
pH: Not available.
Boiling Point: 80.7^o C @ 760 mm Hg
Freezing/Melting Point: 6.5^o C
Decomposition Temperature: Not available
Specific Gravity: 0.77 g/cm^3 @ 20^o C
Vapor Density (Air=1): 2.9
Vapor Pressure: 96.9 mm Hg @ 20^o C.

Evaporation Rate (Butyl acetate = 1): 6.1
Viscosity: 1.02 cP 17° C
Solubility: Practically insoluble in water
Conductivity: Nonconductive; Conductivity = <0.01 pS/m; Dielectric Constant = NA; Relaxation Time Constant = NA

10. STABILITY AND REACTIVITY

Stability: Stable at room temperature in closed containers under normal storage and handling conditions.
Conditions to Avoid: Ignition sources, excess heat, and confined spaces.
Incompatibility with Various Substances: Strong oxidizing agents, nitrogen dioxide.
Hazardous Decomposition Products: Carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, skin absorption, skin contact
Acute Exposure Hazards:

INHALATION HAZARD: Inhalation of vapors irritates the respiratory tract. Overexposure may cause central nervous system depression with lightheadedness, nausea, headache, and blurred vision.

INGESTION HAZARD: May produce gastrointestinal irritation with abdominal pain, nausea, vomiting, and diarrhea. Aspiration into lungs may cause chemical pneumonitis, which may be fatal. May cause central nervous system depression.

SKIN CONTACT HAZARD: May cause redness, irritation, dryness, cracking, and pain. Not expected to cause an allergic skin reaction. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.

EYE CONTACT HAZARD: Vapors cause mild irritation. Splashes may cause redness and pain.

Chronic Exposure Hazards: Repeated or prolonged skin contact may defat the skin and produce irritation and dermatitis.
Animal Toxicity:
Draize test, rabbit, skin: 1458 mg/2D (intermediate);
Inhalation, mouse: LC50 = 70,000 mg/m^3/2H;
Oral, mouse: LD50 = 813 mg/kg
Oral, rat: LD50 = 12,705 mg/kg;
Carcinogenicity: Not listed as a carcinogen by ACGIH, IARC, NTP, or CA Prop 65
Epidemiology: No information available.
Teratogenicity: No information available.
Reproductive Effects: No information available.
Mutagenicity: No information available.
Neurotoxicity: No information available.

12. ECOLOGICAL INFORMATION

Ecotoxicity:
Fish: Fathead minnow: LC50 = 117.0 mg/L, 96H, static conditions;
Fish: Bluegill/sunfish: LC50 = 34.72 mg/L, 96H, 25° C
Water flea: Daphnia: EC50 = 400.0 mg/L, 48H, unspecified;
Bacteria: Phytobacterium phosphoreum: EC50 = 227.0 mg/L, 5,30M
Environmental Fate: Aquatic: Volitization from water (estimated half-life 2 hours in a model river) should be the most important fate process in aquatic systems. Atmospheric: Expected to partition to the atmosphere where it will react rapidly with hydroxyl radicals (half-life 53 hours). The half-life is much faster under photochemical smog conditions with half-lives as low as 6 hours being reported. Terrestrial: If released on land, materials will be lost through volitization and should leach into the ground. Resistant to biodegradation but may biodegrade slowly in the presence of other hydrocarbons that are themselves degraded.
Special Remarks: No experimental data are available on the biocencentration of cyclohexane in aquatic organisms. Using the octanol/water partition coefficient, 3.44, one can estimate a BCF of 242 using a recommended regression equation.

13. DISPOSAL CONSIDERATIONS

Material that cannot be saved for recovery or recycling should be managed in an appropriate and approved waste facility. Processing use or contamination of this product may change the waste management options. Waste generators must decide if discarded material is a hazardous waste. State and local disposal regulations may differ from federal disposal definitions found in 40 CFR 261.3. Dispose of container and unused contents in accordance with federal, state and local requirements. This material is a "U" listed waste (U056 – Ignitable waste).

14. TRANSPORT INFORMATION

US DOT
Proper Shipping Name: Cyclohexane
Hazard Class: 3
UN Number: UN1145
Packing Group: II

IMDG
Proper Shipping Name: Cyclohexane
Hazard Class: 3
UN Number: UN1145
Packing Group: II

IATA
Proper Shipping Name: Cyclohexane
Hazard Class: 3
UN Number: UN1145
Packing Group: II

15. REGULATORY INFORMATION

US Federal Regulations:
CERCLA Hazardous Substances: CAS# 110-82-7 – 1000 lb final RQ; 454 kg final RQ
SARA Section 302: Does not have a TPQ
SARA Codes: CAS# 110-82-7 – immediate, delayed, fire
Section 313: Cyclohexane (CAS# 110-82-7) is subject to SARA Title III Section 313 and 40 CFR 373 reporting requirements.
Clean Water Act: CAS# 110-82-7 is listed as a Hazardous Substance.
OSHA: Not considered highly hazardous by OSHA.

US State Regulations:
CAS# 110-82-7 is on the following state right-to-know lists: New Jersey, Pennsylvania, Minnesota, and Massachusetts
California Prop 65: California No Significant Risk Level: Not listed

16. OTHER INFORMATION

Originally Prepared: 1/1/2006
Last Revised: 9/16/2019 – Updated precautionary statements in Section 2.

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