

# SAFETY DATA SHEET

Flammable Liquid Mixture: 1,3-Butadiene / 4-Vinyl-1-Cyclohexene / Cyclohexane / Cyclohexene / Diethyl Ether / Heptane / Hexane

## Section 1. Identification

- GHS product identifier** : Flammable Liquid Mixture: 1,3-Butadiene / 4-Vinyl-1-Cyclohexene / Cyclohexane / Cyclohexene / Diethyl Ether / Heptane / Hexane
- Other means of identification** : Not available.
- Product use** : Synthetic/Analytical chemistry.
- SDS #** : 020319
- Supplier's details** : Airgas USA, LLC and its affiliates  
259 North Radnor-Chester Road  
Suite 100  
Radnor, PA 19087-5283  
1-610-687-5253
- 24-hour telephone** : 1-866-734-3438

## Section 2. Hazards identification

- OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
- Classification of the substance or mixture** : FLAMMABLE LIQUIDS - Category 1  
SKIN CORROSION/IRRITATION - Category 2  
GERM CELL MUTAGENICITY - Category 1B  
CARCINOGENICITY - Category 1  
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3  
AQUATIC HAZARD (LONG-TERM) - Category 2

### GHS label elements

**Hazard pictograms** :



**Signal word** :

Danger

**Hazard statements** :

Extremely flammable liquid and vapor.  
May form explosive mixtures in Air.  
Causes skin irritation.  
May cause genetic defects.  
May cause cancer.  
May cause drowsiness and dizziness.  
Toxic to aquatic life with long lasting effects.

### Precautionary statements

**General** :

Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

**Prevention** :

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Avoid breathing vapor. Wash hands thoroughly after handling.

## Section 2. Hazards identification

- Response** : Collect spillage. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention.
- Storage** : Store locked up. Store in a well-ventilated place. Keep cool.
- Disposal** : Dispose of contents and container in accordance with all local, regional, national and international regulations.
- Hazards not otherwise classified** : None known.

## Section 3. Composition/information on ingredients

- Substance/mixture** : Mixture
- Other means of identification** : Not available.

### CAS number/other identifiers

- CAS number** : Not applicable.
- Product code** : 020319

Ingredient name	%	CAS number
cyclohexane	94 - 97	110-82-7
heptane	2.5 - 5	142-82-5
Cyclohexene	1 - 2	110-83-8
1,3-butadiene	0.1 - 0.9999	106-99-0
diethyl ether	0.0001 - 0.3	60-29-7
4-vinylcyclohexene	0.1 - 0.2	100-40-3
n-hexane	0.0001 - 0.05	110-54-3

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

**There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.**

Occupational exposure limits, if available, are listed in Section 8.

## Section 4. First aid measures

### Description of necessary first aid measures

- Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.
- Inhalation** : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Skin contact** : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

## Section 4. First aid measures

- Ingestion** : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

### Most important symptoms/effects, acute and delayed

#### Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.
- Skin contact** : Causes skin irritation.
- Frostbite** : Try to warm up the frozen tissues and seek medical attention.
- Ingestion** : Can cause central nervous system (CNS) depression.

#### Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following: pain or irritation, watering, redness
- Inhalation** : Adverse symptoms may include the following: nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness
- Skin contact** : Adverse symptoms may include the following: irritation, redness
- Ingestion** : No specific data.

### Indication of immediate medical attention and special treatment needed, if necessary

- Notes to physician** : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.
- Specific treatments** : No specific treatment.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

## Section 5. Fire-fighting measures

### Extinguishing media

- Suitable extinguishing media** : Use dry chemical, CO<sub>2</sub>, water spray (fog) or foam.
- Unsuitable extinguishing media** : Do not use water jet.

### Specific hazards arising from the chemical

- : Extremely flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

### Hazardous thermal decomposition products

- : Decomposition products may include the following materials:  
carbon dioxide  
carbon monoxide

## Section 5. Fire-fighting measures

- Special protective actions for fire-fighters** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## Section 6. Accidental release measures

### Personal precautions, protective equipment and emergency procedures

- For non-emergency personnel** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.
- For emergency responders** : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

### Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

## Section 7. Handling and storage

### Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

## Section 7. Handling and storage

**Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

## Section 8. Exposure controls/personal protection

### Control parameters

#### Occupational exposure limits

Ingredient name	Exposure limits
cyclohexane	<b>ACGIH TLV (United States, 3/2016).</b> TWA: 100 ppm 8 hours. <b>NIOSH REL (United States, 10/2013).</b> TWA: 1050 mg/m <sup>3</sup> 10 hours. TWA: 300 ppm 10 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 1050 mg/m <sup>3</sup> 8 hours. TWA: 300 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 1050 mg/m <sup>3</sup> 8 hours. TWA: 300 ppm 8 hours.
heptane	<b>ACGIH TLV (United States, 3/2016).</b> STEL: 2050 mg/m <sup>3</sup> 15 minutes. STEL: 500 ppm 15 minutes. TWA: 1640 mg/m <sup>3</sup> 8 hours. TWA: 400 ppm 8 hours. <b>NIOSH REL (United States, 10/2013).</b> CEIL: 1800 mg/m <sup>3</sup> 15 minutes. CEIL: 440 ppm 15 minutes. TWA: 350 mg/m <sup>3</sup> 10 hours. TWA: 85 ppm 10 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 2000 mg/m <sup>3</sup> 8 hours. TWA: 500 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 2000 mg/m <sup>3</sup> 15 minutes. STEL: 500 ppm 15 minutes. TWA: 1600 mg/m <sup>3</sup> 8 hours. TWA: 400 ppm 8 hours.
Cyclohexene	<b>ACGIH TLV (United States, 3/2016).</b> TWA: 300 ppm 8 hours. TWA: 1010 mg/m <sup>3</sup> 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 300 ppm 8 hours. TWA: 1015 mg/m <sup>3</sup> 8 hours. <b>NIOSH REL (United States, 10/2013).</b> TWA: 300 ppm 10 hours. TWA: 1015 mg/m <sup>3</sup> 10 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 300 ppm 8 hours. TWA: 1015 mg/m <sup>3</sup> 8 hours.
1,3-butadiene	<b>ACGIH TLV (United States, 3/2016).</b> TWA: 4.4 mg/m <sup>3</sup> 8 hours. TWA: 2 ppm 8 hours. <b>OSHA PEL (United States, 6/2016).</b> STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b>

## Section 8. Exposure controls/personal protection

diethyl ether	<p>STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. <b>ACGIH TLV (United States, 3/2016).</b> STEL: 1520 mg/m<sup>3</sup> 15 minutes. STEL: 500 ppm 15 minutes. TWA: 1210 mg/m<sup>3</sup> 8 hours. TWA: 400 ppm 8 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 1200 mg/m<sup>3</sup> 8 hours. TWA: 400 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> STEL: 1500 mg/m<sup>3</sup> 15 minutes. STEL: 500 ppm 15 minutes. TWA: 1200 mg/m<sup>3</sup> 8 hours. TWA: 400 ppm 8 hours.</p>
4-vinylcyclohexene	<p><b>ACGIH TLV (United States, 3/2016).</b> TWA: 0.44 mg/m<sup>3</sup> 8 hours. TWA: 0.1 ppm 8 hours. <b>AIHA WEEL (United States, 10/2011).</b> TWA: 1 ppm 8 hours.</p>
n-hexane	<p><b>ACGIH TLV (United States, 3/2016).</b> <b>Absorbed through skin.</b> TWA: 50 ppm 8 hours. <b>NIOSH REL (United States, 10/2013).</b> TWA: 180 mg/m<sup>3</sup> 10 hours. TWA: 50 ppm 10 hours. <b>OSHA PEL (United States, 6/2016).</b> TWA: 1800 mg/m<sup>3</sup> 8 hours. TWA: 500 ppm 8 hours. <b>OSHA PEL 1989 (United States, 3/1989).</b> TWA: 180 mg/m<sup>3</sup> 8 hours. TWA: 50 ppm 8 hours.</p>

### Appropriate engineering controls

- : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

### Environmental exposure controls

- : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

### Individual protection measures

#### Hygiene measures

- : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

#### Eye/face protection

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

#### Skin protection

## Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

## Section 9. Physical and chemical properties

### Appearance

- Physical state** : Liquid.
- Color** : Not available.
- Boiling/condensation point** : Lowest known value: 80.7°C (177.3°F) (cyclohexane). Weighted average: 81.6°C (178.9°F)
- Melting/freezing point** : May start to solidify at the following temperature: 6.5°C (43.7°F) This is based on data for the following ingredient: cyclohexane. Weighted average: -0.29°C (31.5°F)
- Critical temperature** : Lowest known value: 266.85°C (512.3°F) (heptane).
- Odor** : Not available.
- Odor threshold** : Not available.
- pH** : Not available.
- Flash point** : Closed cup: -22°C (-7.6°F)
- Burning time** : Not applicable.
- Burning rate** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not available.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : Not available.
- Vapor density** : Highest known value: 3.46 (Air = 1) (heptane). Weighted average: 2.93 (Air = 1)
- Gas Density (lb/ft<sup>3</sup>)** : Weighted average: 0.77
- Relative density** : Not available.
- Solubility** : Not available.
- Solubility in water** : Not available.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Not available.

## Section 10. Stability and reactivity

- Reactivity** : No specific test data related to reactivity available for this product or its ingredients.
- Chemical stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Conditions to avoid** : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.
- Incompatible materials** : Reactive or incompatible with the following materials:  
oxidizing materials
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.

## Section 11. Toxicological information

### Information on toxicological effects

#### Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
cyclohexane heptane	LD50 Oral	Rat	6240 mg/kg	-
	LC50 Inhalation Gas.	Rat	48000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	50242 ppm	1 hours
1,3-butadiene	LC50 Inhalation Vapor	Rat	103 g/m <sup>3</sup>	4 hours
	LC50 Inhalation Gas.	Rat	128000 ppm	4 hours
	LC50 Inhalation Gas.	Rat	103222 ppm	1 hours
diethyl ether	LD50 Oral	Rat	1211 mg/kg	-
	LD50 Oral	Rat	2560 mg/kg	-
4-vinylcyclohexene	LC50 Inhalation Gas.	Rat	48000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	96000 ppm	1 hours
	LD50 Oral	Rat	15840 mg/kg	-
n-hexane				

#### Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
diethyl ether	Eyes - Moderate irritant	Rabbit	-	100 milligrams	-
	Eyes - Moderate irritant	Rabbit	-	24 hours 100 milligrams	-
	Skin - Severe irritant	Guinea pig	-	24 hours 50 milligrams	-
	Skin - Mild irritant	Rabbit	-	360 milligrams	-
4-vinylcyclohexene	Eyes - Mild irritant	Rabbit	-	0.005 Milliliters	-
	Skin - Moderate irritant	Rabbit	-	0.01 Milliliters	-
n-hexane	Eyes - Mild irritant	Rabbit	-	10 milligrams	-

#### Sensitization

Not available.

#### Mutagenicity

Not available.

#### Carcinogenicity

## Section 11. Toxicological information

Not available.

### Classification

Product/ingredient name	OSHA	IARC	NTP
1,3-butadiene	-	1	Known to be a human carcinogen.
diethyl ether	-	3	-
4-vinylcyclohexene	-	2B	-

### Reproductive toxicity

Not available.

### Teratogenicity

Not available.

### Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
cyclohexane	Category 3	Not applicable.	Narcotic effects
heptane	Category 3	Not applicable.	Narcotic effects
diethyl ether	Category 3	Not applicable.	Narcotic effects
n-hexane	Category 3	Not applicable.	Narcotic effects

### Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
n-hexane	Category 2	Not determined	Not determined

### Aspiration hazard

Name	Result
cyclohexane	ASPIRATION HAZARD - Category 1

**Information on the likely routes of exposure** : Not available.

### Potential acute health effects

- Eye contact** : No known significant effects or critical hazards.
- Inhalation** : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.
- Skin contact** : Causes skin irritation.
- Ingestion** : Can cause central nervous system (CNS) depression.

### Symptoms related to the physical, chemical and toxicological characteristics

- Eye contact** : Adverse symptoms may include the following: pain or irritation, watering, redness
- Inhalation** : Adverse symptoms may include the following: nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness
- Skin contact** : Adverse symptoms may include the following: irritation, redness
- Ingestion** : No specific data.

### Delayed and immediate effects and also chronic effects from short and long term exposure

#### Short term exposure

- Potential immediate effects** : Not available.
- Potential delayed effects** : Not available.

#### Long term exposure

## Section 11. Toxicological information

**Potential immediate effects** : Not available.

**Potential delayed effects** : Not available.

### Potential chronic health effects

Not available.

**General** : No known significant effects or critical hazards.

**Carcinogenicity** : May cause cancer. Risk of cancer depends on duration and level of exposure.

**Mutagenicity** : May cause genetic defects.

**Teratogenicity** : No known significant effects or critical hazards.

**Developmental effects** : No known significant effects or critical hazards.

**Fertility effects** : No known significant effects or critical hazards.

### Numerical measures of toxicity

#### Acute toxicity estimates

Not available.

## Section 12. Ecological information

### Toxicity

Product/ingredient name	Result	Species	Exposure
cyclohexane	Acute LC50 8300 µg/l Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
heptane	Acute LC50 375000 µg/l Fresh water	Fish - Oreochromis mossambicus	96 hours
Cyclohexene	Acute EC50 5300 µg/l Fresh water	Daphnia - Daphnia magna	48 hours
	Acute EC50 4500 µg/l Fresh water	Fish - Poecilia reticulata	96 hours
diethyl ether	Acute LC50 2560000 µg/l Fresh water	Fish - Pimephales promelas	96 hours
n-hexane	Acute LC50 113000 µg/l Fresh water	Fish - Oreochromis mossambicus	96 hours

### Persistence and degradability

Not available.

### Bioaccumulative potential

Product/ingredient name	LogP <sub>ow</sub>	BCF	Potential
cyclohexane	3.44	167	low
heptane	4.66	552	high
Cyclohexene	2.99	23 to 45	low
1,3-butadiene	1.99	10	low
diethyl ether	0.89	5.37	low
4-vinylcyclohexene	3.93	165.96	low
n-hexane	4	501.187	high

### Mobility in soil

**Soil/water partition coefficient (K<sub>oc</sub>)** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

## Section 13. Disposal considerations

**Disposal methods** : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

### United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Cyclohexane (I); Benzene, hexahydro- (I)	110-82-7	Listed	U056

## Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
<b>UN number</b>	UN3161	UN3161	UN3161	UN3161	UN3161
<b>UN proper shipping name</b>	Liquefied gas, flammable n.o.s. (Hexane, 1, 3-butadiene)	Liquefied gas, flammable n.o.s. (Hexane, 1, 3-butadiene)	Liquefied gas, flammable n.o.s. (Hexane, 1, 3-butadiene)	Liquefied gas, flammable n.o.s. (Hexane, 1, 3-butadiene)	Liquefied gas, flammable n.o.s. (Hexane, 1, 3-butadiene)
<b>Transport hazard class(es)</b>	2.1 	2.1 	2.1 	2.1 	2.1 
<b>Packing group</b>	-	-	-	-	-
<b>Environment</b>	No.	No.	No.	Yes.	No.
<b>Additional information</b>	<b>Reportable quantity</b> 1000.1 lbs / 454.05 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.7 (Marine pollutant mark).  The marine pollutant mark is not required when transported by road or rail.  <b>Explosive Limit and Limited Quantity Index</b> 0.125  <b>ERAP Index</b> 3000  <b>Passenger Carrying Ship Index</b> Forbidden  <b>Passenger Carrying Road or Rail Index</b> Forbidden	-	The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.	The environmentally hazardous substance mark may appear if required by other transportation regulations.

## Section 14. Transport information

“Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product.”

**Special precautions for user** : **Transport within user’s premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

**Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code** : Not available.

## Section 15. Regulatory information

**U.S. Federal regulations** : **TSCA 8(a) PAIR:** heptane; diethyl ether; 4-vinylcyclohexene; Cyclohexene  
**TSCA 8(a) CDR Exempt/Partial exemption:** Not determined  
**United States inventory (TSCA 8b):** All components are listed or exempted.  
**Clean Water Act (CWA) 311:** cyclohexane

**Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs)** : Not listed

**Clean Air Act Section 602 Class I Substances** : Not listed

**Clean Air Act Section 602 Class II Substances** : Not listed

**DEA List I Chemicals (Precursor Chemicals)** : Not listed

**DEA List II Chemicals (Essential Chemicals)** : Not listed

### SARA 302/304

#### Composition/information on ingredients

No products were found.

**SARA 304 RQ** : Not applicable.

### SARA 311/312

**Classification** : Fire hazard  
 Immediate (acute) health hazard  
 Delayed (chronic) health hazard

#### Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
cyclohexane	94 - 97	Yes.	No.	No.	Yes.	No.
heptane	2.5 - 5	Yes.	No.	No.	Yes.	No.
Cyclohexene	1 - 2	Yes.	No.	No.	No.	No.
1,3-butadiene	0.1 - 0.9999	Yes.	Yes.	Yes.	Yes.	Yes.
diethyl ether	0.0001 - 0.3	Yes.	No.	No.	Yes.	No.
4-vinylcyclohexene	0.1 - 0.2	Yes.	No.	No.	Yes.	Yes.
n-hexane	0.0001 - 0.05	Yes.	No.	No.	Yes.	Yes.

### SARA 313

**Section 15. Regulatory information**

	Product name	CAS number	%
<b>Form R - Reporting requirements</b>	cyclohexane	110-82-7	94 - 97
	1,3-butadiene	106-99-0	0.1 - 0.9999
<b>Supplier notification</b>	cyclohexane	110-82-7	94 - 97
	1,3-butadiene	106-99-0	0.1 - 0.9999

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

**State regulations**

- Massachusetts** : The following components are listed: HEPTANE; N-HEPTANE; CYCLOHEXANE; HEXAHYDROBENZENE; CYCLOHEXENE
- New York** : The following components are listed: Cyclohexane; Benzene, hexahydro-
- New Jersey** : The following components are listed: n-HEPTANE; HEPTANE; CYCLOHEXANE; 4-VINYLCYCLOHEXENE; CYCLOHEXENE, 4-ETHENYL-; CYCLOHEXENE; 1,2,3,4-TETRAHYDROBENZENE; 1,3-BUTADIENE; BIETHYLENE
- Pennsylvania** : The following components are listed: HEPTANE; CYCLOHEXANE; CYCLOHEXENE, 4-ETHENYL-; CYCLOHEXENE; 1,3-BUTADIENE

**California Prop. 65**

**WARNING:** This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
1,3-butadiene	Yes.	Yes.	Yes.	No.
4-vinylcyclohexene	Yes.	Yes.	No.	No.

**International regulations****International lists****National inventory**

- Australia** : All components are listed or exempted.
- Canada** : All components are listed or exempted.
- China** : All components are listed or exempted.
- Europe** : All components are listed or exempted.
- Japan** : All components are listed or exempted.
- Malaysia** : Not determined.
- New Zealand** : All components are listed or exempted.
- Philippines** : All components are listed or exempted.
- Republic of Korea** : All components are listed or exempted.
- Taiwan** : All components are listed or exempted.

**Canada**

- WHMIS (Canada)** : Class B-2: Flammable liquid  
Class D-2A: Material causing other toxic effects (Very toxic).  
Class D-2B: Material causing other toxic effects (Toxic).
- CEPA Toxic substances:** The following components are listed: 1,3-Butadiene
- Canadian ARET:** None of the components are listed.
- Canadian NPRI:** The following components are listed: Heptane (all isomers); Cyclohexane; Cyclohexene (all isomers)
- Alberta Designated Substances:** None of the components are listed.
- Ontario Designated Substances:** None of the components are listed.
- Quebec Designated Substances:** None of the components are listed.

## Section 16. Other information

**Canada Label requirements** : Class B-2: Flammable liquid  
 Class D-2A: Material causing other toxic effects (Very toxic).  
 Class D-2B: Material causing other toxic effects (Toxic).

### Hazardous Material Information System (U.S.A.)

Health	*	1
Flammability		4
Physical hazards		3

**Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.**

The customer is responsible for determining the PPE code for this material.

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



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

### Procedure used to derive the classification

Classification	Justification
Flam. Liq. 1, H224	Expert judgment
Skin Irrit. 2, H315	Calculation method
Muta. 1B, H340	Calculation method
Carc. 1, H350	Calculation method
STOT SE 3, H336	Calculation method
Aquatic Chronic 2, H411	Expert judgment

### History

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**Version** : 2

### Key to abbreviations

- : ATE = Acute Toxicity Estimate
- : BCF = Bioconcentration Factor
- : GHS = Globally Harmonized System of Classification and Labelling of Chemicals
- : IATA = International Air Transport Association
- : IBC = Intermediate Bulk Container
- : IMDG = International Maritime Dangerous Goods
- : LogPow = logarithm of the octanol/water partition coefficient
- : MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
- : UN = United Nations

## Section 16. Other information

**References** : Not available.

✔ Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.