SECTION 1: Identification

1.1. Identification
Product name: 4-VINYL-1-CYCLOHEXENE
Product code: ENEV4520
Product form: Substance
Physical state: Liquid
Formula: C8H12
Synonyms: VCH 4-ETHENYLCYCLOHEXENE
Chemical family: HYDROCARBON

1.2. Recommended use and restrictions on use
Recommended use: Chemical intermediate

1.3. Supplier
GELEST, INC.
11 East Steel Road
Morrisville, PA 19067
USA
T 215-547-1015 - F 215-547-2484 - (M-F): 8:00 AM - 5:30 PM EST
info@gelest.com - www.gelest.com

1.4. Emergency telephone number
Emergency number: CHEMTREC: 1-800-424-9300 (USA); +1 703-527-3887 (International)

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture
GHS-US classification
Flammable liquids Category 2
Skin corrosion/irritation Category 2
Serious eye damage/eye irritation Category 2B
Carcinogenicity Category 2
Reproductive toxicity Category 2
Hazardous to the aquatic environment - Acute Hazard Category 2

H225 - Highly flammable liquid and vapor
H315 - Causes skin irritation
H320 - Causes eye irritation
H351 - Suspected of causing cancer
H361 - Suspected of damaging fertility or the unborn child
H401 - Toxic to aquatic life

Full text of H statements: see section 16

2.2. GHS Label elements, including precautionary statements
GHS US labeling
Hazard pictograms (GHS US): 

Signal word (GHS US): Danger
Hazard statements (GHS US):
H225 - Highly flammable liquid and vapor
H315 - Causes skin irritation
H320 - Causes eye irritation
H351 - Suspected of causing cancer
H361 - Suspected of damaging fertility or the unborn child
H401 - Toxic to aquatic life

Precautionary statements (GHS US):
P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P308+P313 - If exposed or concerned: Get medical advice/attention.
P210 - Keep away from heat, open flames, sparks. - No smoking.
P233 - Keep container tightly closed.
P240 - Ground/Bond container and receiving equipment
P241 - Use explosion-proof electrical equipment
P242 - Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P264 - Wash hands thoroughly after handling.
P273 - Avoid release to the environment.
P303+P361+P353 - If on skin (or hair): take off immediately all contaminated clothing. Rinse skin with water/shower.
2.3. Hazards not otherwise classified (HNOC)
No additional information available

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/Information on ingredients

3.1. Substances
Substance type: Mono-constituent
Name: 4-VINYL-1-CYCLOHEXENE
CAS-No.: 100-40-3

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>GHS-US classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Vinyl-1-cyclohexene</td>
<td>(CAS-No.) 100-40-3</td>
<td>97 - 100</td>
<td>Flam. Liq. 2, H225&lt;br&gt;Skin Irrit. 2, H315&lt;br&gt;Eye Irrit. 2B, H320&lt;br&gt;Carc. 2, H351&lt;br&gt;Repr. 2, H361&lt;br&gt;Aquatic Acute 2, H401</td>
</tr>
<tr>
<td>2,6-Di-tert-butyl-p-cresol</td>
<td>(CAS-No.) 128-37-0</td>
<td>&lt; 0.1</td>
<td>Acute Tox. 4 (Oral), H302</td>
</tr>
</tbody>
</table>

Full text of hazard classes and H-statements: see section 16

3.2. Mixtures
Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures
First-aid measures general: Remove contaminated clothing and shoes. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). If possible show this sheet; if not available show packaging or label.

First-aid measures after inhalation: Remove victim to fresh air and keep at rest in a position comfortable for breathing. If you feel unwell, seek medical advice.

First-aid measures after skin contact: Wash with plenty of soap and water. Get medical advice/attention.

First-aid measures after eye contact: Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.

First-aid measures after ingestion: Never give anything by mouth to an unconscious person. Get medical advice/attention.

4.2. Most important symptoms and effects (acute and delayed)
Symptoms/effects: Suspected of causing cancer. Suspected of damaging fertility or the unborn child.
Symptoms/effects after inhalation: May be harmful if inhaled.
Symptoms/effects after skin contact: Causes skin irritation.
Symptoms/effects after eye contact: Causes eye irritation.
Symptoms/effects after ingestion: May be harmful if swallowed.

4.3. Immediate medical attention and special treatment, if necessary
No additional information available

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media
Unsuitable extinguishing media: None known.

5.2. Specific hazards arising from the chemical
Fire hazard: Highly flammable liquid and vapor. Irritating fumes and acid vapors may develop when material is exposed to elevated temperatures or open flame.
Explosion hazard: May form flammable/explosive vapor-air mixture.
5.3. Special protective equipment and precautions for fire-fighters

Firefighting instructions: Exercise caution when fighting any chemical fire. Use water spray or fog for cooling exposed containers.
Protection during firefighting: Do not enter fire area without proper protective equipment, including respiratory protection. Avoid all eye and skin contact and do not breathe vapor and mist.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures: Eliminate every possible source of ignition. Use special care to avoid static electric charges.

6.1.1. For non-emergency personnel
Protective equipment: Wear protective equipment as described in Section 8.
Emergency procedures: Evacuate unnecessary personnel.

6.1.2. For emergency responders
Protective equipment: Do not attempt to take action without suitable protective equipment. Equip cleanup crew with proper protection. For further information refer to section 8: “Exposure controls/personal protection”.

6.2. Environmental precautions
Prevent entry to sewers and public waters. Notify authorities if liquid enters sewers or public waters. Avoid release to the environment.

6.3. Methods and material for containment and cleaning up
For containment: Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams.
Methods for cleaning up: Clean up any spills as soon as possible, using an absorbent material to collect it. Use only non-sparking tools.

6.4. Reference to other sections
See Heading 8. Exposure controls and personal protection.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
Additional hazards when processed: Handle empty containers with care because residual vapors are flammable. Keep away from heat, open flames, sparks. - No smoking.
Precautions for safe handling: Do not handle until all safety precautions have been read and understood. Obtain special instructions before use. Avoid all eye and skin contact and do not breathe vapor and mist. Ground/bond container and receiving equipment. Provide good ventilation in process area to prevent accumulation of vapors. Take precautionary measures against static discharge. Use only non-sparking tools.
Hygiene measures: Wash contaminated clothing before reuse. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work.

7.2. Conditions for safe storage, including any incompatibilities
Technical measures: Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof electrical equipment.
Storage conditions: Keep container tightly closed. Keep in a cool place. Store locked up. May freeze if stored <0°C.
Incompatible materials: Oxidizing agent.
Storage area: Store in a well-ventilated place. Store away from heat.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

<table>
<thead>
<tr>
<th>Compound</th>
<th>ACGIH TWA (ppm)</th>
<th>AIHA WEEL TWA (ppm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Vinyl-1-cyclohexene (100-40-3)</td>
<td>0.1 ppm</td>
<td>1 ppm</td>
</tr>
<tr>
<td>2,6-Di-tert-butyl-p-cresol (128-37-0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ACGIH TWA (mg/m³)</td>
<td>2 mg/m³ (inhaletable fraction and vapor)</td>
<td></td>
</tr>
<tr>
<td>NIOSH REL (TWA) (mg/m³)</td>
<td>10 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

8.2. Appropriate engineering controls
Appropriate engineering controls: Provide local exhaust or general room ventilation.
**4-VINYL-1-CYCLOHEXENE**

Safety Data Sheet

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### 8.3. Individual protection measures/Personal protective equipment

**Personal protective equipment:**

Avoid all unnecessary exposure. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

**Hand protection:**

Neoprene or nitrile rubber gloves

**Eye protection:**

Chemical goggles. Contact lenses should not be worn

**Skin and body protection:**

Wear suitable protective clothing

**Respiratory protection:**

Where exposure through inhalation may occur from use, respiratory protection equipment is recommended. NIOSH-certified organic vapor (black cartridge) respirator.

---

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Appearance</td>
<td>Clear liquid.</td>
</tr>
<tr>
<td>Molecular mass</td>
<td>108.18 g/mol</td>
</tr>
<tr>
<td>Color</td>
<td>No data available</td>
</tr>
<tr>
<td>Odor</td>
<td>Strong.</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No data available</td>
</tr>
<tr>
<td>Refractive index</td>
<td>1.463</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Relative evaporation rate (butyl acetate=1)</td>
<td>~ 1</td>
</tr>
<tr>
<td>Melting point</td>
<td>-101 °C</td>
</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>126 - 127 °C</td>
</tr>
<tr>
<td>Flash point</td>
<td>16 °C</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>280 °C</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>Highly flammable liquid and vapor</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>26 mm Hg @ 38°C</td>
</tr>
<tr>
<td>Relative vapor density at 20 °C</td>
<td>&gt; 1</td>
</tr>
<tr>
<td>Relative density</td>
<td>0.832</td>
</tr>
<tr>
<td>% Volatiles</td>
<td>100 %</td>
</tr>
<tr>
<td>Solubility</td>
<td>Very slightly soluble.</td>
</tr>
<tr>
<td>Water</td>
<td>Water: 0.05 g/l</td>
</tr>
<tr>
<td>Log Pow</td>
<td>No data available</td>
</tr>
<tr>
<td>Log Kow</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 9.2. Other information

No additional information available

---

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available

#### 10.2. Chemical stability

Stable.

#### 10.3. Possibility of hazardous reactions

No additional information available
10.4. Conditions to avoid
Heat. Sparks. Open flame.

10.5. Incompatible materials
Oxidizing agent.

10.6. Hazardous decomposition products
Organic acid vapors.

SECTION 11: Toxicological information

11.1. Information on toxicological effects
Acute toxicity: Not classified

4-Vinyl-1-cyclohexene (100-40-3)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>2600 mg/kg</td>
</tr>
<tr>
<td>LD50 dermal rabbit</td>
<td>17000 mg/kg</td>
</tr>
<tr>
<td>LC50 inhalation rat (ppm)</td>
<td>6095 ppm</td>
</tr>
<tr>
<td>LC50 inhalation rat</td>
<td>27000 mg/m³</td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>2600 mg/kg body weight</td>
</tr>
<tr>
<td>ATE US (dermal)</td>
<td>17000 mg/kg body weight</td>
</tr>
</tbody>
</table>

2,6-Di-tert-butyl-p-cresol (128-37-0)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LD50 oral rat</td>
<td>890 mg/kg</td>
</tr>
<tr>
<td>LD50 dermal rat</td>
<td>&gt; 2000 mg/kg</td>
</tr>
<tr>
<td>ATE US (oral)</td>
<td>890 mg/kg body weight</td>
</tr>
</tbody>
</table>

Skin corrosion/irritation: Causes skin irritation.
Skin Irritation - rabbit: 0.01 mL: moderate irritation effect

Serious eye damage/irritation: Causes eye irritation.
Eye Irritation - rabbit: 0.005 mL: mild irritant effect

Respiratory or skin sensitization: Not classified

Germ cell mutagenicity: Not classified
Not mutagenic in Salmonella typhimurium strains.

Carcinogenicity: Suspected of causing cancer.

4-Vinyl-1-cyclohexene (100-40-3)
IARC group: 2B - Possibly carcinogenic to humans
In OSHA Hazard Communication Carcinogen list: Yes

2,6-Di-tert-butyl-p-cresol (128-37-0)
IARC group: 3 - Not classifiable

Reproductive toxicity: Suspected of damaging fertility or the unborn child.
Reproductive toxicity - Mouse - Intraperitoneal
Maternal Effects: Ovaries, fallopian tubes.

Specific target organ toxicity – single exposure: Not classified

Specific target organ toxicity – repeated exposure: Not classified

Aspiration hazard: Not classified

Symptoms/effects after inhalation: May be harmful if inhaled.
Symptoms/effects after skin contact: Causes skin irritation.
Symptoms/effects after eye contact: Causes eye irritation.
Symptoms/effects after ingestion: May be harmful if swallowed.

SECTION 12: Ecological information

12.1. Toxicity
Ecology - general: Toxic to aquatic life.

4-Vinyl-1-cyclohexene (100-40-3)

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC50 Daphnia 1</td>
<td>1.87 mg/l Daphnia magna</td>
</tr>
</tbody>
</table>

12.2. Persistence and degradability
No additional information available

12.3. Bioaccumulative potential
2,6-Di-tert-butyl-p-cresol (128-37-0)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>BCF fish 1</td>
<td>230 - 2500</td>
</tr>
<tr>
<td>Log Pow</td>
<td>4.17</td>
</tr>
</tbody>
</table>

12.4. **Mobility in soil**

No additional information available

12.5. **Other adverse effects**

Other adverse effects: This substance may be hazardous to the environment.

Effect on the ozone layer: No additional information available

**SECTION 13: Disposal considerations**

13.1. **Disposal methods**

Sewage disposal recommendations: Do not dispose of waste into sewer.

Product/Packaging disposal recommendations: Incinerate. Dispose in a safe manner in accordance with local/national regulations. Dispose of contents/container to licensed waste disposal facility.

Additional information: Handle empty containers with care because residual vapors are flammable.

Ecology - waste materials: Avoid release to the environment.

**SECTION 14: Transport information**

14.1. **UN number**

UN-No.(DOT): 1993

DOT NA no.: UN1993

14.2. **UN proper shipping name**

Transport document description: UN1993 Flammable liquids, n.o.s. (4-VINYL-1-CYCLOHEXENE), 3, II

Proper Shipping Name (DOT): Flammable liquids, n.o.s. (4-VINYL-1-CYCLOHEXENE)

Class (DOT): 3 - Class 3 : Flammable and combustible liquid 49 CFR 173.120

Packing group (DOT): II - Medium Danger

Hazard labels (DOT): 3 - Flammable liquid

DOT Packaging Non Bulk (49 CFR 173.xxx): 202

DOT Packaging Bulk (49 CFR 173.xxx): 242

DOT Packaging Exceptions (49 CFR 173.xxx): 150

DOT Symbols: G - Identifies PSN requiring a technical name

14.3. **Additional information**

Emergency Response Guide (ERG) Number: 128

Other information: No supplementary information available.

**Transport by sea**

DOT Vessel Stowage Location: B - (i) The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) “On deck only” on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

**Air transport**

DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27): 5 L

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75): 60 L

**SECTION 15: Regulatory information**

15.1. **US Federal regulations**
4-VINYL-1-CYCLOHEXENE  
Safety Data Sheet

4-Vinyl-1-cyclohexene (100-40-3)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

2,6-Di-tert-butyl-p-cresol (128-37-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.3. US State regulations

WARNING: This product can expose you to 4-Vinyl-1-cyclohexene, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

<table>
<thead>
<tr>
<th>4-Vinyl-1-cyclohexene (100-40-3)</th>
<th>U.S. - California - Proposition 65 - Carcinogens List</th>
<th>U.S. - California - Proposition 65 - Developmental Toxicity</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Male</th>
<th>U.S. - California - Proposition 65 - Reproductive Toxicity - Female</th>
<th>No significant risk level (NSRL)</th>
<th>Maximum allowable dose level (MADL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4-Vinyl-1-cyclohexene (100-40-3)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

2,6-Di-tert-butyl-p-cresol (128-37-0)

U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - Pennsylvania - RTK (Right to Know) List

SECTION 16: Other information

Full text of H-phrases:

H225: Highly flammable liquid and vapor
H302: Harmful if swallowed
4-VINYL-1-CYCLOHEXENE
Safety Data Sheet

H315 Causes skin irritation
H320 Causes eye irritation
H351 Suspected of causing cancer
H361 Suspected of damaging fertility or the unborn child
H401 Toxic to aquatic life

Abbreviations and acronyms:
- Abbreviations: ND: Not Determined, No Data; NA: Not Applicable; LD: Lethal Dose; LC: Lethal Concentration; ATE: Acute Toxicity Estimates; H: hour; °: °C unless otherwise stated; mm: millimeters Hg, torr; PEL: permissible exposure level; TWA: time weighted average; TLV: threshold limit value; TG: Test Guideline; NIOSH: National Institute for Occupational Safety and Health; IARC: International Agency for Research on Cancer; NTP: National Toxicology Program; HMIS: Hazardous Material Information System; CAS No.: Chemical Abstract Service Registration Number; EC No.: European Commission Registration Number; EC Index No.: European Commission Index Number; OECD: The Organisation for Economic Co-operation and Development; GHS: The Globally Harmonized System of Classification and Labelling; APF: Assigned Protection Factor.

Hazard Rating
Health: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability: 4 Severe Hazard - Flammable gases, or very volatile flammable liquids with flash points below 73 F, and boiling points below 100 F. Materials may ignite spontaneously with air. (Class IA)
Physical: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

Prepared by safety and environmental affairs.

Date of issue: 10/17/2016 Version: 1.0

SDS US (GHS HazCom 2012) - Custom
According to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

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