Section 1. Product and Company Identification

Product Name: D-Limonene
Product ID: L3250
Chemical Name (Synonyms): (+)-Dipentene, (+)-Limonene, (+)-R-Limonene, (+)-α-Limonene
Supplier: LKT Laboratories, Inc
545 Phalen Blvd.
St. Paul, MN 55130 USA
Ph: 651-644-8424 Fax: 651-644-8357
www.lktlabs.com - getinfo@lktlabs.com

Emergency Phone #: 1-800-424-9300

Section 2. Hazards Identification

GHS Classification:
- Flammable liquids (Category 3) H226
- Skin irritation (Category 2) H315
- Skin sensitzation (Category 1) H317
- Aspiration hazard (Category 1) H304
- Acute aquatic toxicity (Category 1) H400
- Chronic aquatic toxicity (Category 1) H410

GHS Label elements including precautionary statements

Pictogram
- Danger

Signal word

Hazard and precautionary statements
- H226 - Flammable liquid and vapor.
- H304 - May be fatal if swallowed and enters airways.
- H315 - Causes skin irritation.
- H317 - May cause an allergic skin reaction.
- H410 - Very toxic to aquatic life with long lasting effects.

Precautionary statements
- P210 - Keep away from heat, sparks, open flames, hot surfaces. No smoking.
- P233 - Keep container tightly closed.
- P240 - Ground/bond container and receiving equipment.
- P241 - Use explosion-proof electrical, ventilating, lighting, equipment.
- P242 - Use only non-sparking tools.
- P243 - Take precautionary measures against static discharge.
- P261 - Avoid breathing dust, fumes, gas, mist, vapors, spray.
- P284 - Wash skin thoroughly after handling.
- P272 - Contaminated work clothing should not be allowed out of the workplace.
- P273 - Avoid release to the environment.
- P280 - Wear protective gloves, protective clothing, eye protection, face protection.
- P301 + P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
- P303 + P361 + P353 - IF ON SKIN (or hair): Remove or take off immediately all contaminated clothing. Rinse skin (hair) with water/shower.
- P321 - Specific treatment (see supplemental first aid instructions on this label).
- P331 - Do NOT induce vomiting.
- P333 + P313 - If skin irritation or rash occurs: Get medical advice/attention.
- P362 - Take off contaminated clothing and wash before reuse.
- P370 + P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
- P391 - Collect spillage.
- P403 + P235 - Store in a well-ventilated place. Keep cool.
- P405 - Store locked up.
- P501 - Dispose of contents/container to an approved waste disposal plant.

HMIS Classification
- Health hazard: 2
- Flammability: *
- Physical hazard: 0

NFPA Rating
- Health hazard: 2
- Fire hazard: 2
- Reactivity hazard: 0

Potential Health Effects
- Inhalation: Aspiration hazard. May be fatal if enters airways. harmful if inhaled. May cause respiratory tract irritation.
- Skin: May be harmful if absorbed through skin. Causes skin irritation. May cause an allergic skin reaction.
Section 3. Composition/Information on Ingredients

Substances

<table>
<thead>
<tr>
<th>Ingredient: Title Compound</th>
<th>Percent: 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>C_{10}H_{16}</td>
<td>Formula Wt. 136.23</td>
</tr>
<tr>
<td>5989-27-5</td>
<td>EC No. 227-813-5</td>
</tr>
</tbody>
</table>

Section 4. First Aid Measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

Eye Contact
Flush eyes with water as a precaution.

Skin Contact
Wash off with soap and plenty of water. Consult a physician.

Inhalation
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

Ingestion
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

Section 5. Firefighting Measures

Flash Point
50 °C

Extinguishing Media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Use water spray to cool unopened containers.

Firefighting Procedures
Wear self-contained breathing apparatus for firefighting if necessary.

Unusual Fire Hazards
Carbon oxides.

Section 6. Accidental Release Measures

Personal Precautions
Use personal protective equipment. Avoid breathing vapors, mist, or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

Environmental Precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

Methods and materials for containment and cleanup
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

Section 7. Handling and Storage

Handling
Avoid contact with skin and eyes. Avoid inhalation of vapor or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Storage Conditions
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Recommended storage temperature: Ambient

Hazardous Decomposition Products
Not available.

Other Remarks
D-Limonene, CAS #: 5989-27-5, Value: TWA, Control Parameters: 20.000000 ppm, Basis: USA. ACGIH Threshold Limit Values (TLV). Remarks: Central nervous system impairment, upper respiratory tract irritation, lung damage, skin irritation, adopted values or notations enclosed are those for which changes are proposed in the NIC. See Notice of Intended Changes (NIC). Not classifiable as a human carcinogen, sensitizer, varies.
Section 8. Exposure Controls/Personal Protection

Personal protective equipment

**EXPOSURE CONTROLS**
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

**PERSONAL PROTECTION**

Eye/face protection: Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin protection: Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands. Full and splash contact - Material: Nitrile rubber, Minimum layer thickness: 0.11 mm, Break through time: 460 min., Material tested: Dermatril® (KCL 740 / Aldrich Z677272, Size M).

Body protection: Complete suit protecting against chemicals. Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection: Where risk assessment shows air-purifying respirators are appropriate, use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Section 9. Physical and Chemical Properties

<table>
<thead>
<tr>
<th>Physical State</th>
<th>Color</th>
</tr>
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<tbody>
<tr>
<td>Liquid</td>
<td>Clear liquid.</td>
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<table>
<thead>
<tr>
<th>Boiling Point</th>
<th>Volatility</th>
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<td>168°C</td>
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<table>
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<tr>
<th>Melting Point</th>
<th>Density</th>
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<td>-40°C</td>
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<table>
<thead>
<tr>
<th>Solubility</th>
<th>pH</th>
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</thead>
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</table>

<table>
<thead>
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<th>Flash Point</th>
<th>Ignition temperature</th>
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</thead>
<tbody>
<tr>
<td>50°C</td>
<td>245°C</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Lower explosion limit</th>
<th>Autoignition temperature</th>
</tr>
</thead>
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<td>6.1 percent (V)</td>
<td>245°C</td>
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</table>

<table>
<thead>
<tr>
<th>Upper explosion limit</th>
<th>Vapor pressure</th>
</tr>
</thead>
<tbody>
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<table>
<thead>
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<th>Water solubility</th>
<th>Odor</th>
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<tbody>
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<td>Insoluble in water.</td>
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<table>
<thead>
<tr>
<th>Partition coefficient: n-octanol/water</th>
<th>Odor Threshold</th>
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<tbody>
<tr>
<td>log Pow: 4.2</td>
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</table>

<table>
<thead>
<tr>
<th>Relative vapor density</th>
<th>Evaporation rate</th>
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</thead>
<tbody>
<tr>
<td>4.70</td>
<td>Not available.</td>
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</table>

Section 10. Stability and Reactivity

Stability
Stable under recommended storage conditions.

Materials To Avoid
Strong oxidizing agents.

Hazardous Decomposition Products
Not available.
Section 11. Toxicological Information

**Oral LD50**  
Rat - 4,400 mg/kg  
Remarks: Behavioral: Change in motor activity (specific assay).  
Respiratory disorder Skin and Appendages: Other: Hair.

**Inhalation LC50**  
Not available.

**Dermal LD50**  
Rabbit - > 5,000 mg/kg

**Other information on acute toxicity**  
Not available.

**Skin corrosion/irritation**  
Not available.

**Serious eye damage/irritation**  
Eyes - Rabbit  
Result: No eye irritation (OECD Test Guideline 405)

**Respiratory or skin sensitization**  
Mouse  
Result: May cause sensitization by skin contact. (OECD Test Guideline 429)

**Germ cell mutagenicity**  
Mouse  
lymphocyte  
Result: negative  
Rat - male  
Result: negative

**Reproductive Toxicity**  
Not available.

**Aspiration Hazard**  
Not available.

**Synergistic effects**  
Not available.

**Specific organ toxicity single exposure (GHS)**  
Not available.

**Specific organ toxicity repeated exposure (GHS)**  
Not available.

**Additional Information**  
RTECS: GW6360000  
To the best of our knowledge, the chemical, physical and toxicological properties have not been thoroughly investigated.

**Signs and symptoms of exposure**  
Liver - irregularities - based on human evidence.

**Potential Health Effects**  
Inhalation - Aspiration hazard. May be fatal if enters airways. harmful if inhaled. May cause respiratory tract irritation.  
Skin - May be harmful if absorbed through skin. Causes skin irritation. May cause an allergic skin reaction.  
Eyes - May cause eye irritation.  
Ingestion - May be fatal if swallowed.

**Carcinogenicity**  
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP or EPA classification.  
IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (D-Limonene)  
NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.  
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Section 12. Ecological Information

**Toxicity**  
Toxicity to fish - flow-through test LC50 - Pimephales promelas (fathead minnow) - 0.72 mg/l - 96 h.  
(OECD Test Guideline 203)  
Toxicity to daphnia and other aquatic invertebrates - Immobilization EC50 - Daphnia magna (Water flea) - 0.36 mg/l - 48h (OECD Test Guideline 202)  
Toxicity to bacteria EC50 - Sludge Treatment - 3.94 mg/l

**Mobility in soil**  
Not available.

**PBT and vPvB assessment**  
PBT/vPvB assessment not available as chemical safety assessment not required/not
Section 13. Disposal Considerations

Disposal of material according to all federal, state and local regulations. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Offer material to a licensed, professional waste disposal company to dispose of this material. Dispose of as unused product.

Section 14. Transport Information

DOT (US)  UN number: 2052  Class: 3  Packing Group: III
Proper Shipping Name: Dipentene
Marine Pollutant: Yes  Poison Inhalation Hazard: No

IATA  UN number: 2052  Class: 3  Packing Group: III
Proper Shipping Name: Dipentene

IMDG  UN number: 2052  Class: 3  Packing Group: III  EMS #: F-E, S-E
Proper Shipping Name: DIPENTENE

Section 15. Regulatory Information

SARA 302 Components  SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components  SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Components  Fire hazard, acute health hazard, chronic health hazard

Massachusetts Right To Know Components  No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components  D-Limonene  CAS #: 5989-27-5  Revision Date: 2009-07-17

New Jersey Right To Know Components  D-Limonene  CAS #: 5989-27-5  Revision Date: 2009-07-17

California Prop 65 Components  This product does not contain any chemicals known to the State of California to cause cancer, birth defects or any other reproductive harm.

Section 16. Other Information

Other information  The information in this document is believed to be correct but is not necessarily complete. LKT does not guarantee the accuracy of the information. The burden of verifying the information in this document rests solely upon the user.