attempting use of Florida Chemical Co., Inc.'s d-Limonene on critical parts.

**d-Limonene**

**Material Safety Data Sheet**
Preparation Date: August 2003

Emergency Phone Numbers:
Florida Chemical: (863) 294-8483
CHEMTREC 24 Hour Number (800) 424-9300
In Canada, CANUTEC (613) 996-6666

**Section I - IDENTIFICATION**

Trade Name: d-Limonene
CAS Number: 5989-27-5 - Technical grade & Lemon-Lime grade
CAS Number: 94266-27-4 - Food grade
CAS Number: 68647-72-3 - Orange Terpenes

**Section II - HAZARDOUS COMPONENTS**

Volatile Ingredients: d-Limonene (solvent) is the major component (technical grade 95%, food grade 96%, lemon-lime 70%) with balance other terpene hydrocarbons and oxygenated compounds - octanal, nonanal, decanal, linalool predominant. Product is a by-product of citrus, entirely of natural origin, and to the best of our knowledge and belief contains no artificial flavors, sulfites, nitrites, or pesticide residue exceeding tolerances established by the FDA. Florida Chemical Co., Inc.'s d-Limonene does NOT contain lead, cadmium, mercury, or hexavalent chromium or come in contact with these chemicals since it is a citrus derived essential oil produced by steam distillation. Further, Florida Chemical Co., Inc.'s d-Limonene is packaged in food grade containers with inert liners that do NOT contain lead, cadmium, mercury, or hexavalent chromium. Florida Chemical Co., Inc.'s d-Limonene does NOT contain and is NOT manufactured with any of the Class I or II ozone-depleting substances listed under the United States Clean Air Act of 1990.

Hazardous Materials Identification System - HMIS:

1. Health Hazard - Mild skin irritant
2. Flammability - Flashpoint above 100° F (38° C)
0. Reactivity - Stable
G. Protection - Safety glasses & gloves recommended

**Section III - PHYSICAL DATA**

<table>
<thead>
<tr>
<th></th>
<th>Technical Grade</th>
<th>Food Grade</th>
<th>Lemon-Lime Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Yellow to water-white oil</td>
<td>Water-white oil</td>
<td>Water-white oil</td>
</tr>
<tr>
<td>Odor</td>
<td>Strong orange aroma</td>
<td>Mild orange aroma</td>
<td>Mild lemon-lime aroma</td>
</tr>
<tr>
<td>Specific Gravity</td>
<td>0.838 - 0.843</td>
<td>0.838 - 0.843</td>
<td>0.841 - 0.848</td>
</tr>
</tbody>
</table>
### Section IV - FIRE AND EXPLOSION HAZARD DATA

**Flash Point (cc):** 115°F (46°C) Technical, 113°F (45°C) Food, 119°F (48°C) Lemon-Lime  
**Flammable Limits:** LEL = 0.7% UEL = 6.1% (Identified for Technical grade only)  
**Extinguishing Media:** Carbon dioxide, foam or dry chemical  
**Special Fire Fighting Procedures:** SCBA recommended. Smother to exclude air. **Do not use water.** Handle as an oil fire.  
**Unusual Fire and Explosive Hazards:** Combustible liquid. Keep away from heat, sparks, and open flame. Guard against spontaneous combustion of improperly discarded oily rags.  
**Incompatibility (Materials to avoid):** Strong oxidizing agents and acidic agents including acidic clays, peroxides, halogens, vinyl chloride, and iodine pentafluoride.  
**Hazardous Decomposition Materials:** Smoke may be acrid and fume irritating. Burning generates CO, CO2, and smoke.  
**Hazardous Polymerization:** None described  
**Conditions to Avoid for Polymerization:** Polymerization catalysts such as aluminum chloride and acidic clays.  
**Stability Considerations:** Stable  
**Conditions to Avoid for Stability:** Avoid temperatures over 115°F (46°C)

### Section V - HEALTH HAZARD DATA

**Health Hazards (Acute and Chronic):** Product is harmful if swallowed. Ingestion may cause vomiting, headache, and other medical problems. May be irritating to skin and eyes. Skin contact may cause slight redness. Contains a potential skin sensitizer. Eye contact can cause moderate to high irritation. Inhalation can cause nose, throat, and respiratory tract irritation, coughing and headache. Prolonged or repeated exposure can cause drying, defatting, and dermatitis of skin.  
**Signs and Symptoms of Exposure:** Product may be irritating to the skin, eyes, nose and throat.  
**Medical Conditions Generally Aggravated by Exposure:** Persons with allergies or pre-existing skin conditions should avoid contact with this product.  
**Emergency & First Aid Procedures**  
**Eyes:** Remove contact lenses at once. Flush with water for at least 15 minutes. If irritation persists, seek medical attention.  
**Skin:** Wash affected area with copious amounts of soap and water. If irritation develops, seek medical attention.  
**Ingestion:** Seek medical attention immediately. Do not induce vomiting. Rinse mouth with water, then drink one glass of water. Do not leave victim unattended. Never give anything by mouth if victim is unconscious, is rapidly losing consciousness, or is convulsing.  
**Inhalation:** If symptoms of overexposure are experienced, evacuate to fresh air. If symptoms persist, seek medical attention.
Section VI - TOXICOLOGY DATA

Acute Eye Irritation: Eye irritation, rabbit. Severely irritating.
Acute Skin Irritation: Skin irritation, rabbit. Severely irritating.
Acute Dermal Toxicity: LD50 - >5 g/kg, rabbit.
Acute Respiratory Irritation: No test data found for product.
Acute Inhalation Toxicity: No test data found for product.
Acute Oral Toxicity: LD50 - >5 g/kg, rat.
Chronic Toxicity: This product does not contain any substances that are considered by OSHA, NTP, IARC or ACGIH to be "probable" or "suspected" human carcinogens.
Ecotoxicological Information: Product may be toxic to aquatic organisms.

Section VII - SPILL OR LEAK PROCEDURES

Steps to be Taken if Material is Released or Spilled: Use protective gloves to avoid skin contact. Small spills can be wiped up. Large spills should be absorbed by dirt, sand, or other suitable absorbents for disposal. Do not hose spills down drains, sewers, or waterways. d-Limonene may be toxic to aquatic organisms. Move leaking containers to well ventilated area. No smoking. Eliminate any source of ignition. Minimize inhalation. Use NIOSH approved respiratory protection device in areas of high vapor concentration. CAUTION: slippery on floor.
Waste Disposal Method: Incinerate or Dispose in Accordance with Local, State, and Federal Regulations. Taking regulations into consideration, waste may be incinerated or handled through EPA spill control plan via land fill or dilution.

Section VIII - SPECIAL PROTECTION INFORMATION

Respiratory Protection: Not normally required. If vapor concentration becomes high, use NIOSH approved respirators.
Ventilation: Local exhaust should be adequate. Mechanical ventilation otherwise recommended if necessary.
Skin Protection: Oil resistant gloves.
Eye Protection: Safety goggles or glasses suggested.
Other Protective Equipment: Oil resistant apron, emergency eye wash and shower stations.
Appropriate Hygienic Practices: Wash thoroughly after handling. Launder contaminated clothing before re-use.

Section IX - SPECIAL PRECAUTIONS

Precautions to be Taken in Handling and Storing: Usual precautions for combustible liquids.

Handling and Storage Precautions: Store in a warehouse with a fire prevention system. Avoid contact with incompatible chemicals listed in Section IV. Store in tightly sealed full containers in well-ventilated controlled warehouse conditions. Partially filled containers should be blanketed with nitrogen.

Other Precautions: Product may expand slightly in storage causing pressure to build in container. Open container carefully if product appears to be under pressure. Drum lining may occasionally chip and fall to bottom of container after long storage or excessive handling. As a precaution, pour liquid through filter/strainer to catch small pieces of liner before blending or repackaging. Commercially clean empty containers before re-use. CAUTION: Do not weld or cut empty containers (Vapors May Ignite).
Section X - REGULATORY INFORMATION

Inventory Status
United States (TSCA) Listed on the inventory.
Canada (DSL) Listed on the inventory.
European Union (EINECS) Listed on the inventory.
Australia (AICS) Listed on the inventory.
Japan (MITI) Listed on the inventory.
South Korea (KECL) Listed on the inventory.

Section XI - TRANSPORTATION INFORMATION

All such statements or descriptions are informational only and are not made or given as a warranty of fitness for particular purpose. Buyer is solely responsible for determining the adequacy of each label, or package for the particular use or uses to which they are applied. Florida Chemical Co., Inc. does not assume buyer's responsibility for compliance with or any Federal, State or local laws, rules ordinances or regulations. The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

TDG Status: Hazardous DOT Label/Placard [exemption § 173.150(f) applies:
IMO Status: Hazardous Highway/Rail: per requirements for Combustible Liquids
IATA Status: Hazardous Air/Ship: per requirements for Flammable Liquids

SHIPPING CLASSIFICATION:
Proper Shipping Name: TERPENE HYDROCARBONS, N.O.S.
Hazard Class: 3
Identification No.: UN2319
Packing Group: III

Section XII - ADDITIONAL INFORMATION

National Fire Protection Association Hazard Ratings - NFPA(R):
1 Health Hazard - Slight
2 Flammability - Moderate
0 Reactivity - Minimal

Key Legend Information:
ACGIH American Conference of Governmental Industrial Hygienists
OSHA Occupational Safety and Health Administration
NTP National Toxicology Program
IARC International Agency for Research on Cancer

The information contained herein is based on current knowledge and experience; no responsibility is accepted that the information is sufficient or correct in all cases. Users should consider these data only as a supplement to other information obtained by the user. No
warranty is expressed or implied regarding the accuracy of this data, the results to be obtained from the use thereof, or that any such use will not infringe any patent. Users should make independent determinations of suitability and completeness of information from all sources to assure proper use and disposal of these materials, the safety and health of employees and customers, and the protection of the environment. This information is furnished upon the condition the person receiving it shall determine the suitability for the particular purpose. This MSDS is to be used as a guideline for safe work practices and emergency response.