

## 1. Identification

**Product Identifier:** Technical Grade d-Limonene  
**Product Code(s):** d-Limonene  
**Use:** Component for use in adhesive resins, flavors, fragrances, solvents and degreasing agents. For Industrial/Professional use only.  
**Manufacturer:** Raw Material Suppliers  
 872 Towne Center Drive, Pomona, CA 91767  
**Phone Number:** +1-909-621-5871 (8 a.m. to 4p.m. PST)  
**Emergency Phone:** CHEMTREC 800-424-9300 or +1 (703) 527-3887  
**E-mail:** support@rawmaterialsuppliers.com

## 2. Hazards Identification

### GHS Classification:

Flammable Liquid 3  
 Aspiration Hazard 1  
 Skin Corrosion/Irritant 2  
 Skin Sensitizer 1  
 Chronic Aquatic Hazard 1

**Label Elements:** Danger



### Hazard Phrases

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 Phrases

P210 Keep away from heat, sparks, open flames, and hot surfaces. No smoking.  
 P273 Avoid release into the environment.  
 P280 Wear protective gloves and eye protection.  
 P301+310 IF SWALLOWED: Immediately call a POISON CENTER, doctor or physician.  
 P302+352 IF ON SKIN: Wash with plenty of soap and water.  
 P331 Do NOT induce vomiting.  
 P332+313 If skin irritation occurs: Seek medical advice.  
 P501 Dispose of contents and their containers in accordance with regional, national, and international regulations.

**Supplemental Information:** Contact with eyes may cause redness and irritation.

## 3. Composition/Information on Ingredients

Chemical Name	CAS #	%
Orange, sweet, ext.	8028-48-6	100

## 4. First-Aid Measures

**General information:** As with any chemical, employees should thoroughly wash hands with soap and water after handling this material. If health disorder happens, call for medical help immediately. Immediately remove any clothing soiled by the product.  
**Eye Contact:** Remove any contact lenses at once. Flush eyes with water for at least 15 minutes. If irritation persists, seek medical attention.  
**Skin Contact:** Wash affected area with copious amounts of soap and water. If irritation develops, seek medical attention.  
**Inhalation:** If symptoms of overexposure are experienced, move to fresh air.

**Ingestion:** Seek medical attention immediately. DO NOT induce vomiting. Rinse mouth with water. DO NOT offer water or anything to drink that might cause vomiting. DO NOT administer anything by mouth to an unconscious person. DO NOT leave victim unattended.

**Most important symptoms and effects, both acute and delayed** Skin irritation and skin sensitization. The product may be fatal if swallowed and enters airways. Inhalation may cause irritation of the nose, throat, and respiratory tract.

**Indication of any immediate medical attention and special treatment needed:** In case of ingestion do not induce vomiting. DO NOT administer anything by mouth to an unconscious person. DO NOT leave victim unattended.

## 5. Fire-Fighting Measures

**Extinguishing media:** Carbon dioxide, foam or dry chemical. Caution: Carbon dioxide will displace air in confined spaces and may create an oxygen deficient atmosphere. Unsuitable Extinguishing Media: Water.

**Special hazards arising from the substance or mixture:** Do not use water with full jet to prevent fire spreading. In case of fire, the following can be released: carbon monoxide (CO), carbon dioxide (CO<sub>2</sub>), smoke, soot.

**Advice for firefighters:** Vapors may be irritating to eyes, skin and respiratory tract. Firefighters should wear self-contained breathing apparatus (SCBA) and full fire-fighting turnout gear. Special hazards: Product contains combustible organic ingredients. Fire may produce dense black smoke containing hazardous products of combustion. Additional information: Cool endangered receptacles with water spray. Collect contaminated firefighting water separately. It must not enter the sewage system. Dispose of fire debris and contaminated firefighting water in accordance with official regulations.

## 6. Accidental Release Measures

**Personal precautions, protective equipment and emergency procedures:** Use personal protection recommended in Section 8.

Product is slippery when spilled. Isolate the hazard area. Deny entry to unnecessary and unprotected personnel.

**Environmental Precautions:** Prevent further leakage or spillage. Keep away from drains, surface- and ground-water and soil. Inform respective authorities in case of seepage into water course or sewage system. Do not allow to enter sewers, surface or ground water.

**Methods and material for containment and cleaning up:** Dike spill area and cap leaking containers as necessary to prevent further spreading of spilled material. Absorb spilled liquid with suitable material such as dirt or sand. Eliminate all ignition sources. Use equipment rated for use around combustible materials. Place in appropriate disposal container. Oil soaked rags may spontaneously combust; place in appropriate disposal container.

**References to other sections:** None

## 7. Handling and Storage

**Precautions for safe handling:** Use personal protection equipment as mentioned under "exposure controls/personal protection". Keep away from heat, sparks and flame. Protect against electrostatic charges. Open container slowly to release pressure caused by temperature variations. Do not allow this material to come in contact with eyes. Avoid prolonged contact with skin. Use in well-ventilated areas. Do not breathe vapors. Drum lining may occasionally chip and fall to the bottom of container; product should be filtered or strained before blending or repackaging. As with any chemical, employees should thoroughly wash hands with soap and water after handling this material.

**Conditions for safe storage, including any incompatibilities:** Product may be packaged in phenolic-lined steel containers or fluorinated plastic containers. Store in a well ventilated area with proper sprinkler/fire

deterrent system. Storage temperature should not exceed the flash point for extended periods of time. Store away from oxidizing agents. Keep container closed when not in use. Air should be excluded from partially filled containers by displacing with nitrogen or carbon dioxide. Do not cut, drill, grind or weld on or near this container; residual vapors may ignite.

**Specific end use(s):** No further relevant information available.

## 8. Exposure Controls/Personal Protection

### Control Parameters:

Exposure Guidelines: Ingredients with limit values that require monitoring at the workplace: CAS 5989-27-5, (R)-p-mentha-1,8-diene AGW (Germany): 110 mg/m<sup>3</sup>, 20 ppm, 2 (II); DFG, Sh, Y AIHA Standard: 8h TWA=30 ppm

Engineering Controls: Normal room ventilation is usually adequate. Provide exhaust ventilation or other engineering controls to keep the airborne concentration below any regulated limits. Keep away from sparks and flames.

### Exposure Controls:

General protective and hygienic measures: Use personal protective equipment depending on concentration and amount of hazardous substance. Keep away from foodstuffs, beverages and feed. Immediately remove all soiled and contaminated clothing. Wash hands before breaks and at the end of the work. Avoid contact with eyes and skin.

Eye/Face Protection: Tightly sealed goggles according to EN 166:2001

Skin Protection: Preventative skin protection by use of skin-protection agents is recommended. Use protective gloves. Material of gloves: The selection of suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer. As the product is a preparation of several substances, the resistance of the glove material cannot be calculated in advance and has to be checked prior to the application. Penetration time of glove material: >480 minutes at layer thickness of 0.425 mm (Sol-Vex (37-695) from Ansell).

For the permanent contact gloves made of the following materials are suitable: Nitrile rubber, NBR (e.g. following product: Sol-Vex (37-695) from Ansell). As protection from splashes gloves made of the following materials are suitable: PVC Gloves.

Respiratory Protection: Suitable respiratory protection: Filter class A2 (brown colour). Use the rules for application of respiratory protection systems.

## 9. Physical and Chemical Properties

**Appearance:** Clear Liquid

**Color:** Colorless to Pale Yellow

**Odor:** Strong Orange Aroma

**Physical State:** Liquid at 20°C (68°F)

**pH:** N/A

**Boiling Point:** 176 °C (348.8 °F)

**Melting Point:** -96 °C (-141 °F)

**Specific Gravity:** 0.838 - 0.843 at 25°C (77°F)

**Refractive Index:** 1.471 - 1.474 at 20°C (68°F)

**Optical Rotation:** +96.00° to +104.00° at 25°C (77°F)

**Vapor Pressure:** < 2 mmHg at 20°C (68°F)

**Vapor Density:** 4.7 (Air = 1)

**Decomposition Temperature:** N/A

**Viscosity:** 0.923 cP at 25°C (77°F)

**Flash Point (Closed Cup) :** >43°C (>109 °F)

**Flammable Limits:** 0.7% LEL; 6.1% UEL

**Auto ignition Temperature:** 237°C (459 °F)

**Solubility in Water:** Immiscible

**Evaporation Rate:** 0.2 (BuAc=1)

**Partition coefficient (n-octanol/water):** Kow=4.23 (for d-limonene)

**Other information:** None listed.

## 10. Stability and Reactivity

**Reactivity:** Minimal hazard

**Chemical stability:** Stable

**Possibility of hazardous reactions:** BHT, an antioxidant, can be added to prevent oxidation. Avoid long-term exposure to air. If storing partially-filled containers, fill headspace with an inert gas such as nitrogen or carbon dioxide.

**Conditions to avoid:** Keep away from heat, sparks and flames.

Incompatible materials Strong oxidizing agents and strong acids, including acidic clays, peroxides, halogens, vinyl chloride, and iodine pentafluoride.

**Hazardous decomposition products:** Oxides of d-limonene, which can result from improper storage and handling, are known to cause skin sensitization. No decomposition if stored properly.

## 11. Toxicological Information

### Information on toxicological effects

Acute effects: d-Limonene has been shown to have low oral toxicity (LD50>2 g/kg) when tested on rats and showed low dermal toxicity (LD50> 5g/kg) when tested on rabbits. The product may be fatal if swallowed and enters airways. An LC50 is not established. Inhalation may cause irritation of the nose, throat, and respiratory tract. The product is a skin irritant. The product may cause sensitization by skin contact.

Chronic effects: This product is not classified for repeated dose toxicity. This product is not classified as a carcinogen by IARC or U.S. ACGIH, NTP or OSHA. This product has not been shown to produce genetic changes when tested on bacterial or animal cells. This product does not contain known reproductive or developmental toxins.

Likely Routes of Exposure: Inhalation, skin and eye contact Symptoms: Skin irritation and skin sensitization. The product may be fatal if swallowed and enters airways. Inhalation may cause irritation of the nose, throat, and respiratory tract.

Target organs: Eyes, respiratory system and skin

## 12. Ecological Information

**Toxicity:** According to the official classification this product may be very toxic to aquatic life. However, due to the physical properties of the product (density and volatility) it will not remain in the environment for an extended period of time.

LC50 (fish and daphnia) = 0.1 to 1 mg/L (per REACH dossier)

**Persistence and degradability:** d-Limonene is classified as readily biodegradable.

**Bioaccumulative potential:** The geometric mean of three predicted BCF for d-limonene is 683, i.e. BCF < 2000 L/kg. Consistently the Log Kow is below 4.5. d-Limonene is not bioaccumulative.

**Mobility in soil:** Citrus extractives volatilize rapidly. Citrus extractives are expected to volatilize from soil or water to the air and oxidize to carbon dioxide in the presence of sunlight.

**Results of PBT and vPvB assessment:** d-Limonene is readily biodegradable, and with a predicted BCF of 683 L/kg. All aquatic EC50/LC50 are higher than 0.1mg/L, therefore d-limonene should not be considered environmentally toxic (the official classification includes H410 for long lasting effects on the aquatic toxicity and hence, at least for the time being the substance shall be classified as such). d-Limonene is not PBT.

**Other adverse effects:** None listed.

### 13. Disposal Considerations

**Waste treatment methods:** Recycling is strongly preferred to disposal or burning. If disposing, please do so in accordance with official regulations in your area. Keep in mind that this product should not be disposed along with household garbage. Do not allow this product to reach any sewage waste system, as it may be detrimental to aquatic life.

Recommendation: Empty contaminated packaging thoroughly. Packaging may be recycled or repurposed after thorough and proper cleaning. Note that this packaging may not be cleansed and disposed of in the same manner as the product.

Moistened solids (e.g. cloth, pulp, filter panels, binger) can be burnt after consulting with the waste disposal facility operator and the pertinent authorities and adhering to the necessary technical regulations

### 14. Transport Information

**UN Number:**

US DOT/ADR/RID: UN2319 (primary), UN1169 (alternate), UN1993 (alternate)

IMDG: UN2319 (primary), UN1169 (alternate), UN1993 (alternate)

IATA/ICAO: UN2319 (primary), UN1169 (alternate), UN1993 (alternate)

UN proper shipping name US DOT, ADR/RID, IMDG, IATA/ICAO:  
UN2319 – Terpene Hydrocarbons, N.O.S.

UN1169 – Extracts, Aromatic, Liquid

UN1993 – Flammable Liquid, N.O.S. (d-Limonene)

Transport hazard class: 3

Label: 3 Flammable Liquid, Symbol fish and tree

Label/Placard: exception §173.150(f) applies (US DOT only)

Packing Group: III

Environmental hazards: Marine pollutant Special precautions for user none listed

EMS Number: F-E, S-E

**Emergency Shipping Information:** Call CHEMTREC, 800-424-9300 or +1-703-527-3887

### 15. Regulatory Information

**Safety, health and environmental regulations/legislation specific for the substance or mixture:** The Safety Data Sheet complies with the requirements of Regulation (EC) No 1907/2006.

Chemical safety assessment: A Chemical Safety Assessment has been carried out.

General information: If a health disorder occurs, receive medical attention immediately. Immediately remove any clothing soiled by the product.

After inhalation: Supply fresh air and to be sure call for a doctor. In case of unconsciousness, place patient stably in side position for transportation.

After skin contact: immediately wash with water and soap and rinse thoroughly.

After eye contact: Rinse opened eye for several minutes under running water.

After swallowing: Do not induce vomiting; call for medical help immediately.

Applicable CAS numbers:

8028-48-6 Orange, sweet, extract

5989-27-5 d-limonene, (R)-p-mentha-1,8-diene

94266-47-4 Citrus terpenes, citrus ext

68647-72-3 Terpenes and terpenoids, sweet orange oil

68608-34-4 Terpenes and terpenoids, citrus oil

### 16. Other Information

This product was produced with Good Manufacturing Practices. It is a by-product of citrus, entirely of natural origin, and to the best of our knowledge contains no artificial flavors, sulfites, nitrites, or pesticide residue exceeding tolerances established by the U.S. FDA. It has not been adulterated or misbranded. It 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/vacuum distillation. Further, it is packaged in food grade containers with inert liners that do NOT contain lead, cadmium, mercury, or hexavalent chromium. It 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.

Caution: The user should conduct his/her own experiments and establish proper procedures and control before attempting use on critical parts.

**SDS Revision Notes:** GHS Format; May 29, 2018

**Disclaimer:** The information contained herein is considered accurate; however, Raw Material Suppliers makes no warranty regarding the accuracy of the information. The user must determine the suitability of the product for the intended use and accepts all risk and liability associated with that use.