



GreenChem Industries LLC

## SAFETY DATA SHEET

Revised on: 03/12/2019

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### Section 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

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**Product Identifier:**

Product Name: D-Limonene  
Common Names: D-limonene

**Relevant identified uses of the substance or mixture and uses advised against:**

For use in adhesive resins, flavors, fragrances, solvents and degreasing agents.

**Details of the supplier of the safety data sheet**

Supplier: GreenChem Industries  
Address: 222 Clematis St. Suite 207  
West Palm Beach, Florida 33401  
Phone: 561-659-2236  
Fax: 561-659-2237  
Email: info@greenchemindustries.com

**Emergency telephone number**

For emergencies call Chemtrec anytime at 1-800-424-9300

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### Section 2: HAZARD(S) IDENTIFICATION

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**Classification of the substance or mixture**

*In accordance with CLP Regulation (EC) No. 1272 / 2008*





GHS Category Codes and Hazard Classes:

2.6 - Flam. Liq. 3:	H226 – Flammable liquid and vapour
3.10 - Asp. Haz. 1:	H304 – May be fatal if swallowed and enters airways
3.2 - Skin Irrit. 2:	H315 – Causes skin irritation
3.4 S - Skin Sens. 1:	H317 – May cause an allergic skin reaction
4.1 C - Aqu. Chron. 1:	H410 – Very toxic to aquatic life with long lasting effects

## Label elements

In accordance with CLP Regulation (EC) No. 1272 / 2008

Signal Word: *Danger*

GHS Pictograms	Hazard Statements	Precautionary Statements
 GHS02	<u>H226</u> Flammable Liquid and Vapor	<b>P210</b> – Keep away from heat, sparks, open flames, and hot surfaces. No smoking. <b>P273</b> – Avoid release into the environment.
 GHS08	<u>H304</u> May Be Fatal if Swallowed and Enters Airways	<b>P280</b> – Wear protective gloves and use eye protection. <b>P301 + P310</b> – IF SWALLOWED: Immediately call a POISON CENTER, doctor or physician.
 GHS07	<u>H315</u> Causes Skin Irritation	<b>P302 + P352</b> – IF ON SKIN: Wash with plenty of soap and water. <b>P331</b> – Do NOT induce vomiting.
	<u>H317</u> May Cause an Allergic Skin Reaction	<b>P332 + P313</b> – If skin irritation occurs: Seek medical advice.
 GHS09	<u>H410</u> Very Toxic to Aquatic Life with Long Lasting Effects	<b>P501</b> – Dispose of contents and their containers in accordance with regional, national, and international regulations.

**Additional Hazards:** Contact with eyes may cause redness or irritation.

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## Section 3: COMPOSITION/INFORMATION ON INGREDIENTS

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### Substances

<u>Component</u>	<u>CAS #</u>	<u>EC #</u>	<u>% by Wt.</u>
D-Limonene	5989-27-5	227-813-5	100.0%

ECHA Registration #: 01-2119529223-47-0006

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## Section 4: FIRST AID MEASURES

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### Description of 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.

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**Section 5: FIRE FIGHTING MEASURES**

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**Extinguishing media**

Suitable 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 fire fighting water separately. It must not enter the sewage system. Dispose of fire debris and contaminated fire fighting water in accordance with official regulations.

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**Section 6: ACCIDENTAL RELEASE MEASURES**

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**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

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**Section 7: HANDLING AND STORAGE**

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**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.

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**Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION**

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**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.

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## Section 9: PHYSICAL AND CHEMICAL PROPERTIES

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### Information on basic 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):	≥48°C (≥118 °F)
Flammable Limits:	0.7% LEL; 6.1% UEL
Autoignition 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.

*Note: These properties represent a typical sample of the product, but actual values may vary. Certificates of Analysis and Specification Sheets are available upon request.*

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## Section 10: STABILITY AND REACTIVITY

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### 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.

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## Section 11: TOXICOLOGICAL INFORMATION

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**Information on toxicological effects***Acute effects*

d-Limonene has been shown to have low oral toxicity ( $LD_{50} > 2$  g/kg) when tested on rats and showed low dermal toxicity ( $LD_{50} > 5$ g/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 sensitisation 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 sensitisation. 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

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## Section 12: ECOLOGICAL INFORMATION

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**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.

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## Section 13: DISPOSAL CONSIDERATIONS

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**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. *European waste catalogue: e.g. 02 03 03 wastes from solvent extraction.*

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. *European waste catalogue: e.g. 15 02 02 Filter and absorption materials contaminated with hazardous agents.*

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## Section 14: TRANSPORT INFORMATION

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**DOT: Not Regulated for Ground Transportation by the DOT at <119 Gallons as per 49 CFR 173.150**

**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

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## Section 15: REGULATORY INFORMATION

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**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 (attached as Annex).

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.

**Proposition 65**

Proposition 65 chemicals are not expected to be found in this product at levels above those naturally present in their agricultural source. Proposition 65 exempts listed naturally occurring chemicals from an obligation to provide a warning or label.

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## Section 16: OTHER INFORMATION

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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.

## Legend

ACGIH – American Conference of Governmental Industrial Hygienists  
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road  
AIHA – American Industrial Hygiene Association  
BHT – Butylated Hydroxytoluene  
CAS # - Chemical Abstracts Service  
CFR – United States Code of Federal Regulations  
DOT – United States Department of Transportation  
EC# - European Commission (aka EINECS, European Inventory of Existing Commercial chemical Substances)  
ECHA - European Chemicals Agency  
FDA – United States Food and Drug Administration  
GHS - Globally Harmonized System of Classification and Labeling of Chemicals  
GRAS – Generally Recognized as Safe  
IARC – International Agency for Research on Cancer  
IATA – International Air Transport Association  
ICAO – International Civil Aviation Organization  
IMDG – International Maritime Code for Dangerous Goods  
NFPA – National Fire Protection Association  
NIOSH – United States National Institute for Occupational Safety and Health  
NTP – United States National Toxicology Program  
OSHA – United States Occupational Health and Safety Administration  
RID – Regulations Concerning the International Transport of Dangerous Goods by Rail  
TWA –Time Weighted Average

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

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