SAFETY DATA SHEET

Preparation Date: 1/17/2017 **Revision Date:** 1/17/2017 **Revision Number:** G1

1. IDENTIFICATION

Product identifier

Product code: HS005
Product Name: (+/-)-LIMONENE, HISTOLOGICAL GRADE

Other means of identification

Synonyms: dl-Limonene
p-Menthane
1-Methyl-4-isopropenyl-1-cyclohexene
1,8(9)-p-Menthadiene
p-Mentha-1,8-diene, DL-
delta-1,8-Terpodiene

CAS #: 138-86-3
RTECS # OS8100000
CI#: Not available

Recommended use of the chemical and restrictions on use

Recommended use: No information available.
Uses advised against No information available

Supplier: Spectrum Chemical Mfg. Corp
14422 South San Pedro St.
Gardena, CA 90248
(310) 516-8000.

Order Online At: https://www.spectrumchemical.com
Emergency telephone number Chemtrec 1-800-424-9300
Contact Person: Martin LaBenz (West Coast)
Contact Person: Ibad Tirmiz (East Coast)

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous according to the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Considered a dangerous substance or mixture according to the Globally Harmonized System (GHS)

Skin corrosion/irritation	Category 2
Serious eye damage/eye irritation	Category 2A
Skin sensitization	Category 1
Aspiration toxicity	Category 1
Flammable liquids	Category 3

Label elements

Danger

Hazard statements

Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
May be fatal if swallowed and enters airways
Flammable liquid and vapor

Hazards not otherwise classified (HNOC)
Not Applicable

Other hazards
May be harmful if swallowed

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing must not be allowed out of the workplace
Keep away from heat/sparks/open flames/hot surfaces. — No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/.../equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves
Wear eye/face protection

Precautionary Statements - Response

In case of fire: Use CO2, dry chemical, or foam to extinguish.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If skin irritation or rash occurs: Get medical advice/attention
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting

Precautionary Statements - Storage
Store locked up
Store in a well-ventilated place. Keep cool

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Components	CAS-No.	Weight %
(±)-Limonene	138-86-3	100

4. FIRST AID MEASURES

First aid measures

General Advice: National Capital Poison Center in the United States can provide assistance if you have a poison emergency and need to talk to a poison specialist. Call 1-800-222-1222.

Skin Contact: Wash off immediately with soap and plenty of water removing all contaminated clothing and shoes. Get medical attention. If skin irritation persists, call a physician.

Eye Contact: Flush eyes with water for 15 minutes. Get medical attention.

Inhalation: Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

Ingestion: Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Consult a physician if necessary.

Most important symptoms and effects, both acute and delayed

Symptoms Causes serious eye irritation. Moderately irritating to the skin. May cause an allergic skin reaction. Aspiration hazard if swallowed - can enter the lungs and cause damage. Aspiration into the lungs may cause pulmonary edema. Aspiration into the lungs may cause chemical pneumonitis. Causes digestive (gastrointestinal) tract irritation. May cause abdominal pain, nausea, vomiting, diarrhea. Weak, rapid pulse or rapid heart rate (Tachycardia). May affect the liver. It may affect the kidneys. May affect respiration. Respiratory depression. Dyspnea (Difficulty breathing and shortness of breath). May cause central nervous system effects.

Indication of any immediate medical attention and special treatment needed

Notes to Physician: Treat symptomatically.

Protection of first-aiders
First-Aid Providers: Avoid exposure to blood or body fluids. Wear gloves and other necessary protective clothing. Dispose of contaminated clothing and equipment as bio-hazardous waste.

5. FIRE-FIGHTING MEASURES

Extinguishing Media

Suitable Extinguishing Media: Carbon dioxide (CO_2). Dry chemical. Water spray mist or foam. Alcohol-resistant foam.

Unsuitable Extinguishing Media: Do not use a solid (straight) water stream as it may scatter and spread fire.

Specific hazards arising from the chemical

Hazardous Combustion Products: Carbon monoxide; Carbon dioxide

Hazardous Combustion Products: No information available.

Specific hazards: Flammable. May be ignited by heat, sparks or flames. Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. Most vapors are heavier than air. They will spread along the ground and collect in low or confined areas (sewers, basements, tanks). Container explosion may occur under fire conditions or when heated. Fire may produce irritating, corrosive and/or toxic gases.

Special Protective Actions for Firefighters

Specific Methods: Water mist may be used to cool closed containers. For larger fires, use water spray or fog. Cool containers with flooding quantities of water until well after fire is out.

Special Protective Equipment for Firefighters: As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal Precautions: Ensure adequate ventilation. Keep people away from and upwind of spill/leak. Avoid contact with skin, eyes and clothing. Use personal protective equipment. Remove all sources of ignition. Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use spark-proof tools and explosion-proof equipment. In case of large spill, water spray or vapor suppressing foam may be used to reduce vapors, but may not prevent ignition in closed spaces.

Environmental precautions Prevent further leakage or spillage if safe to do so. Prevent product from entering drains. Prevent entry into waterways, sewers, basements or confined areas.

Methods and material for containment and cleaning up

Methods for containment Stop leak if you can do it without risk. Absorb spill with inert material (e.g. vermiculite, dry sand or earth). In case of large spill, dike if needed. Dike far ahead of liquid spill for later disposal.

Methods for cleaning up Use appropriate tools to put the spilled material in a suitable chemical waste disposal container. Use clean non-sparking tools to collect absorbed material. Clean contaminated surface thoroughly.

7. HANDLING AND STORAGE

Precautions for safe handling

Technical Measures/Precautions:
Provide sufficient air exchange and/or exhaust in work rooms. Remove all sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Keep away from incompatible materials.

Safe Handling Advice
Wear personal protective equipment. Use only in well-ventilated areas. Avoid contact with skin, eyes and clothing. Keep away from heat and sources of ignition. Do not breathe vapors or spray mist. Do not ingest. When using do not smoke. Handle in accordance with good industrial hygiene and safety practice.

Conditions for safe storage, including any incompatibilities

Technical Measures/Storage Conditions:
Keep container tightly closed in a dry and well-ventilated place. Store at room temperature in the original container. Store in a segregated and approved area. Store away from incompatible materials.

Incompatible Materials:
Oxidizing agents

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

National occupational exposure limits

United States

Components	CAS-No.	OSHA	NIOSH	ACGIH	AIHA WHEEL
(±)-Limonene	138-86-3	None	None	None	None

Canada

Components	CAS-No.	Canada - Alberta	Canada - British Columbia	Canada - Ontario	Canada - Quebec
(±)-Limonene	138-86-3	None	None	None	None

Australia and Mexico

Components	CAS-No.	Australia	Mexico
(±)-Limonene	138-86-3	None	None

Appropriate engineering controls

Engineering measures to reduce exposure: Ensure adequate ventilation. Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors and mist below their respective threshold limit value.

Individual protection measures, such as personal protective equipment

Personal Protective Equipment

Eye protection: Goggles

Skin and body protection: Chemical resistant apron. Long sleeved clothing. Gloves.

Respiratory protection: Vapor respirator. Be sure to use an approved/certified respirator or equivalent.

Hygiene measures: Avoid contact with skin, eyes and clothing. When using, do not eat, drink or smoke. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical state:
Liquid

Appearance:
Clear.

Color:
Colorless to pale yellow.

Odor:
Pleasant. Citrus-like. Lemon-like.

Taste
Fresh. Citrus.

Formula:
C10-H16

Molecular/Formula weight:
136.23

Flammability:
Flammable

Flashpoint (°C/°F):
43-45°C/109-113°F

Flash Point Tested according to:
Closed cup

Autoignition Temperature (°C/°F):
237°C/458.6°F

Lower Explosion Limit (%):
0.7%

Upper Explosion Limit (%):
6.1%

Melting point/range(°C/°F):
-95.5 to -89 °C/-139.9 to -128 °F

Decomposition temperature(°C/°F):
No information available

Boiling point/range(°C/°F):
175-178°C/347-352.4°F

Bulk density:
No information available

Density (g/cm3):
No information available

Specific gravity:
0.84-0.85 @ 20°C

pH:
No information available

Vapor pressure @ 20°C (kPa):
0.13-0.17

Evaporation rate:
No information available

Vapor density:
4.7

VOC content (g/L):
No information available

Odor threshold (ppm):
No information available

Partition coefficient (n-octanol/water):
log Kow = 4.57

Viscosity:
No information available

Miscibility:
Miscible with Ether
Miscible with alcohol

Solubility:
Practically insoluble in water

10. STABILITY AND REACTIVITY

Reactivity
Reactive with oxidizing agents
Reacts violently with a mixture of iodine pentafluoride and tetrafluoroethylene, causing fire and explosion hazard

Chemical stability

Stability: Stable under recommended storage conditions.

Possibility of Hazardous Reactions: Hazardous polymerization does not occur

Conditions to avoid: Heat. Ignition sources. Incompatible materials.

Incompatible Materials: Oxidizing agents

Hazardous decomposition products: Carbon monoxide. Carbon dioxide. When heated to decomposition it emits acrid smoke and irritating fumes.

Other Information
Corrosivity: No information available

Special Remarks on Corrosivity: No information available

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principal Routes of Exposure:
Ingestion. Skin. Eyes. Inhalation.

Acute Toxicity

Component Information

(±)-Limonene	
CAS-No.	138-86-3

LD50/oral/rat = 5300 mg/kg Oral LD50 Rat
LD50/oral/mouse = 5550 ul/kg
LD50/dermal/rabbit = No information available
LD50/dermal/rat = No information available
LC50/inhalation/rat = No information available
LC50/inhalation/mouse = No infomation available

Other LD50 or LC50information = No information available

Product Information

LD50/oral/rat =
VALUE- Acute Tox Oral = 5300 mg/kg

LD50/oral/mouse =
Value - Acute Tox Oral = No information available

LD50/dermal/rabbit
VALUE-Acute Tox Dermal = No information available

LD50/dermal/rat
VALUE -Acute Tox Dermal = No information available

LC50/inhalation/rat
VALUE-Vapor = No information available
VALUE-Gas = No information available
VALUE-Dust/Mist = No information available

LC50/Inhalation/mouse
VALUE-Vapor = No information available
VALUE - Gas = No information available
VALUE - Dust/Mist = No information available

Symptoms

Skin Contact:	Contact causes skin irritation. Moderately irritating to the skin. It may be absorbed through the skin. May cause allergic skin reaction/rashes/urticaria (hives).
Eye Contact:	Causes serious eye irritation. Moderately irritating to the eyes.
Inhalation	May cause irritation of respiratory tract. May affect respiration (respiratory depression).
Ingestion	Aspiration hazard if swallowed. Aspiration into the lungs can cause chemical pneumonitis. Aspiration may lead to pulmonary edema. May cause digestive (gastrointestinal) tract irritation with nausea, vomiting, diarrhea. It causes irritation or a burning sensation of the mouth and throat. May cause abdominal pain. Ingestion may cause coughing and choking due to irritant effects. May affect respiration (dyspnea, respiratory depression). It may cause central nervous system depression. May affect behavior/central nervous system (somnolence, ataxia). It may affect behavior/central nervous system (convulsions, excitement). May affect the kidneys (albuminuria, hematuria). May affect the cardiovascular system (tachycardia).
Aspiration hazard	Aspiration hazard. May be fatal if swallowed and enters airways.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Chronic Toxicity	Skin: Sensitizer. May cause allergic skin reaction (allergic contact dermatitis). Prolonged or repeated ingestion may affect the liver, and kidneys.
Sensitization:	May cause sensitization by skin contact.
Mutagenic Effects:	No information available

Carcinogenic effects: Not classifiable as to its carcinogenicity to humans.

Components	CAS-No.	IARC	ACGIH - Carcinogens	NTP	OSHA HCS - Carcinogens	Australia - Notifiable Carcinogenic Substances	Australia - Prohibited Carcinogenic Substances
(±)-Limonene	138-86-3	Not listed	Not listed	Not listed	Not listed	Not listed	Not listed

ACGIH (American Conference of Governmental Industrial Hygienists)

IARC (International Agency for Research on Cancer)

NTP (National Toxicology Program)

OSHA (Occupational Safety and Health Administration of the US Department of Labor)

Reproductive toxicity No data is available

Reproductive Effects: No information available
Developmental Effects: No information available
Teratogenic Effects: No information available

Specific Target Organ Toxicity

STOT - single exposure No information available.
STOT - repeated exposure No information available.
Target Organs: Skin. Liver. Kidneys.

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity effects: Aquatic environment.

(±)-Limonene - 138-86-3
Freshwater Fish Species Data: 86-568 ppm 96 hr. LC50 Oncorhynchus mykiss (Rainbow Trout)
38.5 mg/l 96 hr. LC50 Pimephales promelas (Fathead minnow)
Water Flea Data: 17 ppm 48 hr. EC50 Daphnia magna (water flea)

Persistence and degradability: No information available

Bioaccumulative potential: Potential for bioconcentration in aquatic organisms is high.

Mobility: It is expected to have low mobility based upon estimated Koc.

13. DISPOSAL CONSIDERATIONS

Disposal Methods

Waste from residues / unused products:
Waste must be disposed of in accordance with Federal, State and Local regulation.

Contaminated packaging:
Empty containers should be taken for local recycling, recovery or waste disposal

Components	CAS-No.	RCRA - F Series Wastes	RCRA - K Series Wastes	RCRA - P Series Wastes	RCRA - U Series Wastes
(±)-Limonene	138-86-3	None	None	None	None

14. TRANSPORT INFORMATION

DOT

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Class	No information available
Packing group:	III
Emergency Response Guide Number	128
Marine Pollutant	Marine Pollutant
DOT RQ (lbs):	No information available
Special Provisions	B1, IB3, T2, TP1
Symbol(s):	[DOT]: (P) - Identifies a material that is a marine pollutant.
Description:	UN2052, Dipentene, 3, III

TDG (Canada)

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Risk:	No information available
Packing Group:	III
Marine Pollutant	Marine Pollutant
Description:	UN2052, Dipentene, 3, III

ADR

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Packing Group:	III
Subsidiary Risk:	No information available
Description:	UN2052, Dipentene, 3, III, ENVIRONMENTALLY HAZARDOUS

IMO / IMDG

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Risk:	P
Packing Group:	III
Marine Pollutant	Marine Pollutant
EMS:	F-E
Description	UN2052, Dipentene, 3, III, Marine pollutant

RID

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Risk:	No information available
Packing Group:	III
Description:	UN2052, Dipentene, 3, III, ENVIRONMENTALLY HAZARDOUS

ICAO

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Risk:	No information available
Packing Group:	III
Description:	UN2052, Dipentene, 3, III

IATA

UN-No:	UN2052
Proper Shipping Name:	Dipentene
Hazard Class:	3
Subsidiary Risk:	No information available
Packing Group:	III
ERG Code:	3L
Special Provisions	No information available
Description:	UN2052, Dipentene, 3, III

15. REGULATORY INFORMATION

International Inventories

Components	CAS-No.	U.S. TSCA	KOREA KECL	Philippines (PICCS)	Japan ENCS	CHINA	Australia (AICS)	EINECS-No.
(±)-Limonene	138-86-3	Present	Present KE-24396	Present	Present (7)-988 (3)-2245 (3)-2226	Present	Present	Present 205-341-0

U.S. Regulations

(±)-Limonene

New Jersey RTK Hazardous Substance List: 0792

California Prop. 65: Safe Drinking Water and Toxic Enforcement Act of 1986.

Chemicals Known to the State of California to Cause Cancer:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Chemicals Known to the State of California to Cause Reproductive Toxicity:
This product does not contain a chemical requiring a warning under California Prop. 65. (See table below)

Components	CAS-No.	Carcinogen	Developmental Toxicity	Male Reproductive Toxicity	Female Reproductive Toxicity:
(±)-Limonene	138-86-3	Not Listed	Not Listed	Not Listed	Not Listed

CERCLA/SARA

Components	CAS-No.	CERCLA - Hazardous Substances and their Reportable Quantities	Section 302 Extremely Hazardous Substances and TPQs	Section 302 Extremely Hazardous Substances and RQs	Section 313 - Chemical Category	Section 313 - Reporting de minimis
(±)-Limonene	138-86-3	None	None	None	None	None

U.S. TSCA

Components	CAS-No.	TSCA Section 5(a)2 - Chemicals With Significant New Use Rules (SNURS)	TSCA 8(d) -Health and Safety Reporting
(±)-Limonene	138-86-3	Not Applicable	Not Applicable

Canada

WHMIS hazard class:
B3 Combustible liquid
D2B Toxic materials

Components	WHIMHAZ
(±)-Limonene	B3 D2B

Canada Controlled Products Regulation:
This product has been classified according to the hazard criteria of the CPR (Controlled Products Regulation) and the MSDS contains all of the information required by the CPR.

Components	**WHMIS Ingredient Disclosure List -**
(±)-Limonene	1 %

Inventory

Components	CAS-No.	**Canada (DSL)**	**Canada (NDSL)**
(±)-Limonene	138-86-3	Present	Not Listed

Components	CAS-No.	**CEPA Schedule I - Toxic Substances**
(±)-Limonene	138-86-3	Not listed
Components	CAS-No.	**CEPA - 2010 Greenhouse Gases Subject to Mandatory Reporting**
(±)-Limonene	138-86-3	Not listed

EU Classification

R-phrase(s)

R10 - Flammable.
R38 - Irritating to skin.
R43 - May cause sensitization by skin contact.
R50 - Very toxic to aquatic organisms.
R53 - May cause long-term adverse effects in the aquatic environment.

S -phrase(s)

S 2 - Keep out of the reach of children.
S24 - Avoid contact with skin.
S37 - Wear suitable gloves.
S60 - This material and its container must be disposed of as hazardous waste.
S61 - Avoid release to the environment. Refer to special instructions/safety data sheets.

Components	CAS-No.	**Classification**	**Concentration Limits:**	**Safety Phrases**
(±)-Limonene	138-86-3	R10 Xi; R38 R43 N; R50-53	No information	S2 S24 S37 S60 S61

The product is classified in accordance with Annex VI to Directive 67/548/EEC

Indication of danger:
Xi - Irritant.
N - Dangerous for the environment.

16. OTHER INFORMATION

Preparation Date: 1/17/2017
Revision Date: 1/17/2017

Prepared by: Sonia Owen

Disclaimer: All chemicals may pose unknown hazards and should be used with caution. This Safety Data Sheet (SDS) applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. The physical properties reported in this SDS are obtained from the literature and do not constitute product specifications. Information contained herein does not constitute a warranty, whether expressed or implied, as to the safety, merchantability or fitness of the goods for a particular purpose. Spectrum Chemicals & Laboratory Products, Inc. assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of these data. No warranty against infringement of any patent, copyright or trademark is made or implied. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Spectrum assumes no responsibility for the completeness or accuracy of the information contained herein.

End of Safety Data Sheet