SAFETY DATA SHEET

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	D-Limonene
CAS number	5989-27-5
Synonyms	(+)-Limonene; Citrine; (+)-4-Isopropenyl-1-methylcyclohexene

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	Laboratory Chemicals

1.3 Details of the supplier of the safety data sheet

Company	Lab Alley, LLC 12501 Pauls Valley Road Austin, Texas 78737 U.S.A.
Telephone	512-668-9918
Fax	512-886-4008

1.4 Emergency telephone

Emergency Phone #	US & Canada: 1-800-535-5053	INFOTRAC
	International 1-352-323-3500	INFOTRAC

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3)
Skin irritation (Category2)
Skin sensitization (Category 1)
Aspiration hazard (Category 1)
Long-term (chronic) aquatic hazard (Category 1)

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal Word: Danger

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

Precautionary statements

Prevention
P210 - Keep away from heat, sparks, open flames and hot surfaces. No smoking.
P233 - Keep container tightly closed.
P240 - Ground and bond container and receiving equipment.
P241 + P242 - Use explosion proof electrical, ventilating and lighting equipment. Use only non-sparking tools.
P243 - Take precautionary measures against static discharge.
P261 - Avoid breathing mists, vapor or spray.
P264 - Wash hands or other skin areas contacting this product 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 and eye protection.

Response
P301 + P331 + P310 - IF SWALLOWED: DO NOT induce vomiting. Immediately call a POISON CENTER or doctor.
P303 + P361 + P353 - IF ON SKIN (or hair): Remove immediately all contaminated clothing. Rinse skin with water or shower.
P304 + P340 + P312 - IF INHALED: Remove victim to fresh air and keep at rest in a comfortable position for breathing. Call a POISON CENTER or doctor if you feel unwell.
P321 - Specific treatment: Seek medical attention if you feel unwell. Refer to Section 4 of this SDS.
P333 + P313 - If skin irritation or rash occurs: Get medical attention.
P362 - Take off contaminated clothing and wash before reuse.
P370 + P378 - In case of fire: Use water fog or spray, foam, dry chemical or carbon dioxide for extinction.
P391 - Collect spillage.
Storage
P405 + P403 + P235 - Store locked up in a well-ventilated place. Keep cool.
Disposal
P501 - Dispose of contents and container in accordance with national and local regulations.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May cause drying and cracking of the skin.

SECTION 3: Composition/information on ingredients

3.1 Components

Chemical name	Common name and synonyms	CAS number	Concentration
D-Limonene	(+)-Limonene; Citrine; (+)-4-Isopropenyl-1-methylcyclohexene	5989-27-5	<=100%

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice — If symptoms persist, call a physician.

If inhaled — Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

In case of skin contact — Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists,call a physician.

In case of eye contact — Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

If swallowed — Clean mouth with water and drink afterwards plenty of water.

4.2 Most important symptoms and effects, both acute and delayed

Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

4.3 Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media Alcohol-resistant foam, Carbon dioxide (CO2), Dry chemical.

Unsuitable extinguishing media High volume water jet.

5.2 Specific hazards arising from the substance or mixture

Do not allow run-off from fire fighting to enter drains or water courses. Carbon oxides. Combustible. Vapors are heavier than air and may spread along floors. Forms explosive mixtures with air at elevated temperatures. Development of hazardous combustion gases or vapors possible in the event of fire.

5.3 Special protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

5.4 Further information

Flash Point 48 °C / 118.4 °F

Autoignition Temperature 237 °C / 458.6 °F

Explosion limits

Upper 6.10%

Lower 0.70%

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

NFPA

Health	Flammability	Instability	Physical hazards
3	2	0	N/A

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions

Avoid dispersal of spilled material or runoff and prevent contact with soil and entry into drains, sewers or waterways. Use water sparingly to minimize environmental contamination and reduce disposal requirements.

6.3 Methods and materials for containment and cleaning up

Approach spill from upwind direction. DO NOT FLUSH SPILL DOWN THE DRAIN. Cover drains and contain spill. Cover with a large quantity of inert absorbent. Do not use combustible absorbents such as sawdust. Collect product using non-sparking tools and place into approved container for proper disposal. Observe possible material restrictions (Sections 7.1 and 10.5). Clean contaminated area with soap and water. Do not allow material or runoff from rinsing contaminated areas to enter floor drains or storm drains and ditches that lead to waterways. Dispose of contents and containers via a licensed waste disposal contractor.

6.4 Reference to other sections

Refer to protective measures listed in Sections 7 and 8. See section 13 for proper disposal.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation.

Hygiene measures

Keep away from heat, sparks, open flames and hot surfaces. To avoid fire or explosion, dissipate static electricity by grounding and bonding containers and equipment before transferring material.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat, sparks and flame. Keep container tightly closed in a dry and well-ventilated place.

Incompatibilities

Strong acids. Strong oxidizing agents.

SECTION 8: Exposure controls/personal protection

8.1 Occupational exposure limits

This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Biological occupational exposure limits

No information available.

8.2 Exposure controls

Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting equipment.

Personal protective equipment

Eye/face protection

Wear safety glasses with unperforated side shields or chemical splash goggles during use.

Skin protection

Wear butyl rubber gloves or those recommended by glove supplier for protection against materials in Section 3. Gloves should be impermeable to chemicals and oil. Breakthrough time of selected gloves must be greater than the intended use period.

Body Protection

Wear protective clothing. Wear protective boots if the situation requires.

Respiratory protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Control of environmental exposure

Do not empty into drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Clear to pale yellow
Odor	Sweet, Citrus
Odor Threshold	200 ppb
pH	No information available

Melting Point/Range	- 96 °C (- 140.8 °F)
Boiling Point/Range	176 °C (348.8 °F)
Evaporation Rate	0.2 [n-BuOAc = 1]
Flammability (solid)	No information available
Flammability or explosive limit	
Upper	6.10%
Lower	0.70%
Vapor Pressure	< 2 mm Hg @ 20° C
Vapor Density	4.7 [Air = 1]
Specific Gravity	0.838 - 0.843 @ 25 °C
Solubility	Immiscible in water
Partition coefficient; n-octanol/water	log Pow = 4.23
Autoignition Temp	237 °C / 458.6 °F
Decomposition Temp	No information available
Viscosity	0.923 cp @ 25° C
Molecular Formula	C10 H16
Molecular Weight	136.23
VOC Content(%)	>95%
Oxidizing properties	Not oxidizing

9.2 Other safety information

No information available.

SECTION 10: Stability and reactivity

10.1 Reactivity

None known, based on information available.

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Violent reactions possible with: Strong oxidizing agents, acids

10.4 Conditions to avoid

Keep away from heat, flame, sparks and other ignition sources.

10.5 Incompatible materials

Strong acids. Strong oxidizing agents.

10.6 Hazardous decomposition products

Carbon oxides. Hydrocarbon fragments.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Product Information, Component Information

Acute toxicity

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
D-Limonene	>2000 mg/kg (Rat)	>5000 mg/kg (Rat)	Not listed

Skin corrosion/irritation

Irritating to skin.

Serious eye damage/eye irritation

May cause eye irritation.

Respiratory or skin sensitization

May cause an allergic skin reaction and sensitization; may cause allergic respiratory reaction.

Germ cell mutagenicity

No information available.

Carcinogenicity

Component	CAS	IARC	NTP	ACGIH	OSHA	Mexico
D-Limonene	5989-27-5	Group 3	Not listed	Not listed	Not listed	Not listed

Specific target organ toxicity - single exposure

May cause respiratory irritation.

Specific target organ toxicity - repeated exposure

None known.

Reproductive toxicity

No information available.

Chronic effects

No information available.

11.2 Additional Information

No information available.

SECTION 12: Ecological information

12.1 Toxicity

Component	Freshwater Algae	Freshwater Fish	Bacteria	Water Flea
D-Limonene	0.32 mg/L ErC50 = 72 h 0.174 mg/L EC10 = 72 h	0.72 mg/L LC50 = 96 h	3.94 mg/L EC50	Acute 0.307 mg/L EC50 = 48 h Chronic 0.08 mg/L NOEC = 21 days

12.2 Persistence and degradability

Readily biodegradable.

12.3 Bio accumulative potential

Terpene hydrocarbons have the potential to bioaccumulate.

12.4 Mobility in soil

Terpene hydrocarbons absorb to soil and have low mobility.

12.5 Results of PBT and vPvB assessment

This substance is not persistent, bioaccumulative and toxic (PBT) and not very persistent and very bioaccumulative (vPvB).

12.6 Endocrine disrupting properties

No information available.

12.7 Other adverse effects

Do not allow material to run into surface waters, wastewater or soil. An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

SECTION 13: Disposal considerations

13.1 Waste Disposal Methods

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN Number UN2052

Proper Shipping name	Dipentene
Hazard Class	3
Packaging Group	III

IMDG

UN Number	UN2052
Proper Shipping name	Dipentene
Hazard Class	3
Packaging Group	III

IATA

UN Number	UN2052
Proper Shipping name	Dipentene
Hazard Class	3
Packaging Group	III

SECTION 15: Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not listed/applicable.

CERCLA Hazardous Substance List (40 CFR 302.4)

Not listed/applicable.

SARA 304 Emergency release notification

Not listed/applicable.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not listed/applicable.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed/applicable.

SARA 311/312 Hazardous

Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 (TRI reporting)

Not listed/applicable.

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Not listed/applicable.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not listed/applicable.

Safe Drinking Water Act

Not listed/applicable.

FEMA Priority Substances Respiratory Health and Safety in the Flavor Manufacturing Workplace

Not listed/applicable.

US state regulations

US. Massachusetts RTK - Substance List

Not listed.

US. New Jersey Worker and Community Right-to-Know Act

5989-27-5 d-Limonene.

US. Pennsylvania Worker and Community Right-to-Know Law

5989-27-5 d-Limonene.

California Proposition 65

This product does not contain any chemicals known to the State of California to cause cancer, birth defects, or any other re-productive harm.

SECTION 16: Other information

Date of Issue: 7/7/2025

SECTION 17: Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.