# SAFETY DATA SHEET

**Creation Date** 22-Oct-2010 **Revision Date** 19-Dec-2025 **Revision Number** 8

**This safety data sheet was created pursuant to the requirements of: US OSHA Hazard Communication Standard 2024 (29 CFR 1910.1200)**

## 1. Identification

**Product Name** **LIMONENE**

**Cat No. :** **AC203730000; AC203731000; AC203735000**

**CAS No** 5989-54-8
**Synonyms** (-)-Dipentene

**Recommended Use** Laboratory chemicals.
**Uses advised against** Food, drug, pesticide or biocidal product use.

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

**Company**
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

**Emergency Telephone Number**
For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
**CHEMTREC** Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

## 2. Hazard(s) identification

**Classification**
This chemical is considered hazardous according to [US] OSHA (29 CFR 1910.1200, 2024)

| | |
|---|---|
| Flammable liquids | Category 3 |
| Skin Corrosion/Irritation | Category 2 |
| Serious Eye Damage/Eye Irritation | Category 2 |
| Skin Sensitization | Category 1 |
| Reproductive Toxicity | Category 2 |
| Aspiration Toxicity | Category 1 |

**Label Elements**

**Signal Word**
Danger

**Hazard Statements**

Flammable liquid and vapor
May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause an allergic skin reaction
Suspected of damaging fertility or the unborn child

**Precautionary Statements**
**Prevention**
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wash face, hands and any exposed skin thoroughly after handling
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking
Keep container tightly closed
Ground and bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Wear protective gloves/protective clothing/eye protection/face protection
Take action to prevent static discharges
Use non-sparking tools
**Response**
IF exposed or concerned: Get medical attention/advice
**Skin**
If skin irritation or rash occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower
Take off contaminated clothing and wash before reuse
**Eyes**
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
**Ingestion**
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
**Fire**
In case of fire: Use CO2, dry chemical, or foam to extinguish
**Storage**
Store locked up
Store in a well-ventilated place. Keep cool
**Disposal**
Dispose of contents/container to an approved waste disposal plant
**Hazards not otherwise classified (HNOC)**
Very toxic to aquatic life with long lasting effects

**Hazards classified under paragraph (d)(1)(ii) of 1910.1200**
No information available

## 3. Composition/information on Ingredients

| Component | CAS No | Weight % |
|---|---|---|

| | | |
|---|---|---|
| L-Limonene | 5989-54-8 | 93 |
| D-Limonene | 5989-27-5 | 3 |
| p-Cymene | 99-87-6 | 2 |
| 1,8-Cineol | 470-82-6 | 2 |

## 4. First-aid measures

**General Advice** If symptoms persist, call a physician.

**Eye Contact** Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

**Skin Contact** Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

**Inhalation** Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur. Risk of serious damage to the lungs (by aspiration).

**Ingestion** Clean mouth with water and drink afterwards plenty of water. Do NOT induce vomiting. Call a physician or poison control center immediately. If vomiting occurs naturally, have victim lean forward.

**Most important symptoms and effects** None reasonably foreseeable. May cause allergic skin reaction. 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

**Notes to Physician** Treat symptomatically

## 5. Fire-fighting measures

**Suitable Extinguishing Media** Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers.

**Unsuitable Extinguishing Media** No information available

**Flash Point** 48 °C / 118.4 °F

**Method -** No information available

**Autoignition Temperature** 237 °C / 458.6 °F

**Explosion Limits**

**Upper** 6.10%
**Lower** .70%
**Sensitivity to Mechanical Impact** No information available
**Sensitivity to Static Discharge** No information available

**Specific Hazards Arising from the Chemical**
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Do not allow run-off from fire-fighting to enter drains or water courses.

**Hazardous Combustion Products**
Carbon monoxide (CO). Carbon dioxide ($CO_2$).
**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.

**NFPA**

| Health | Flammability | Instability | Physical hazards |
|---|---|---|---|
| 3 | 2 | 0 | N/A |

## 6. Accidental release measures

**Personal Precautions** Ensure adequate ventilation. Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges.

**Environmental Precautions** Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

**Methods for Containment and Clean Up** Keep in suitable, closed containers for disposal. Soak up with inert absorbent material. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

## 7. Handling and Storage

**Handling** Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Take precautionary measures against static discharges.

**Storage.** 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. Incompatible Materials. Strong bases. oxygen. Peroxides. Strong acids. Oxidizing agent.

## 8. Exposure controls / personal protection

**Exposure Guidelines** This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

**Engineering Measures** 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 appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure.

**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.

**Recommended Filter type:** Organic gases and vapours filter. Type A. Brown. conforming to EN14387.

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

## 9. Physical and chemical properties

**Appearance**

| | |
|---|---|
| **Physical State** | Liquid |
| **Color** | Clear |
| **Odor** | sweet |
| **Odor Threshold** | No information available |

| Property | Values | Remarks • Method |
|---|---|---|
| **Melting Point/Range** | -104 - -84 °C / -155.2 - -119.2 °F | |
| **Softening Point** | No data available | |
| **Boiling Point/Range** | 175 - 177 °C / 347 - 350.6 °F | @ 760 mmHg |
| **Flash Point** | 48 °C / 118.4 °F | **Method -** No information available |
| **Flammability (liquid)** | Flammable | On basis of test data |
| **Flammability (solid,gas)** | Not applicable | Liquid |
| **Explosion Limits** | **Lower** 0.7<br>**Upper** 6.1 | |
| **Autoignition Temperature** | 237 °C / 458.6 °F | |
| **Decomposition Temperature** | No data available | |
| **pH** | Not applicable | |
| **Viscosity** | No data available | |
| **Water Solubility** | practically insoluble | |
| **Solubility in other solvents** | No information available | |
| **Partition Coefficient (n-octanol/water)** | | |
| **Component** | **log Pow** | |
| L-Limonene | 4.38 | |
| D-Limonene | 4.38 | |
| p-Cymene | 4.8 | |
| 1,8-Cineol | 3.4 | |
| **Vapor Pressure** | 2.1 hPa @ 20.0 °C | |
| **Density / Specific Gravity** | 0.842 | |
| **Bulk Density** | Not applicable | Liquid |
| **Vapor Density** | 4.7 | (Air = 1.0) |
| **Particle characteristics** | Not applicable (liquid) | |

**Other Information**

| | |
|---|---|
| **Molecular Formula** | C10 H16 |
| **Molecular Weight** | 136.24 |
| **Explosive Properties** | explosive air/vapour mixtures possible |

## 10. Stability and reactivity

**Reactive Hazard** None known, based on information available

**Stability** Stable under recommended storage conditions.

**Conditions to Avoid** Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Incompatible products.

**Incompatible Materials** Strong bases, oxygen, Peroxides, Strong acids, Oxidizing agent

**Hazardous Decomposition Products** Carbon monoxide (CO), Carbon dioxide ($CO_2$)

**Hazardous Polymerization** Hazardous polymerization does not occur.

**Hazardous Reactions** None under normal processing.

## 11. Toxicological information

**Information on expected route of exposure**

**Inhalation** Avoid breathing vapors or mists. May produce an allergic reaction.

**Ingestion** May cause allergic reaction. May be harmful if swallowed. Harmful if swallowed. Potential for aspiration if swallowed.

**Eyes** Avoid contact with eyes. Sensitization.

**Skin** Avoid contact with skin. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. Prolonged skin contact may defat the skin and produce

dermatitis.

**Toxicology data for the components**

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|---|---|---|---|
| D-Limonene | LD50 = 5200 mg/kg ( Rat ) | LD50 > 5 g/kg ( Rabbit ) | - |
| p-Cymene | LD50 = 4750 mg/kg ( Rat ) | LD50 > 5000 mg/kg ( Rabbit ) | LC50 > 9.7 mg/L ( Rat ) 5 h |
| 1,8-Cineol | 4300 mg/kg ( Rat ) | - | - |

**Toxicologically Synergistic Products** No information available

**(b) skin corrosion/irritation;** Category 2

**(c) serious eye damage/irritation;** No data available

**(d) respiratory or skin sensitization;**

**Respiratory** No data available

**Skin** Category 1

May cause sensitization by skin contact

**(e) germ cell mutagenicity;** No data available

**(f) carcinogenicity;**

The table below indicates whether each agency has listed any ingredient as a carcinogen

| Component | CAS No | IARC | NTP | ACGIH | OSHA | Mexico |
|---|---|---|---|---|---|---|
| L-Limonene | 5989-54-8 | Not listed | Not listed | Not listed | Not listed | Not listed |
| D-Limonene | 5989-27-5 | Not listed | Not listed | Not listed | Not listed | Not listed |
| p-Cymene | 99-87-6 | Not listed | Not listed | Not listed | Not listed | Not listed |
| 1,8-Cineol | 470-82-6 | Not listed | Not listed | Not listed | Not listed | Not listed |

**(g) reproductive toxicity;** No data available

**(h) STOT-single exposure;** No data available

**(i) STOT-repeated exposure;** No data available

**Target Organs** None known.

**(j) aspiration hazard;** Category 1

**Symptoms / 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.

**Other Adverse Effects** The toxicological properties have not been fully investigated.

**Endocrine Disrupting Properties** This product does not contain any known or suspected endocrine disruptors.

## 12. Ecological information

**Ecotoxicity**

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|---|---|---|---|---|
| D-Limonene | Not listed | LC50: = 35 mg/L, 96h (Oncorhynchus mykiss) LC50: 0.619 - 0.796 mg/L, 96h flow-through (Pimephales promelas) | Not listed | Not listed |
| p-Cymene | Not listed | LC50: 48 mg/L/96h (sheepshead minnow) | Not listed | LC50: 6.5 mg/L/48h |
| 1,8-Cineol | Not listed | LC50: 95.4 - 109 mg/L, 96h flow-through (Pimephales promelas) | Not listed | Not listed |

**Persistence and Degradability** May persist

**Bioaccumulation/ Accumulation** No information available.

**Mobility** Is not likely mobile in the environment due its low water solubility.

| Component | log Pow |
|---|---|
| L-Limonene | 4.38 |
| D-Limonene | 4.38 |
| p-Cymene | 4.8 |
| 1,8-Cineol | 3.4 |

## 13. Disposal considerations

**Waste Disposal Methods** Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

## 14. Transport information

**DOT**

**UN-No** UN2052
**Proper Shipping Name** DIPENTENE
**Hazard Class** 3
**Packing Group** III

**TDG**

**UN-No** UN2052
**Hazard Class** 3
**Packing Group** III

**IATA**

**UN-No** UN2052
**Proper Shipping Name** DIPENTENE
**Hazard Class** 3
**Packing Group** III

**IMDG/IMO**

**UN-No** UN2052
**Proper Shipping Name** DIPENTENE
**Hazard Class** 3
**Packing Group** III

## 15. Regulatory Information

**United States of America Inventory**

| Component | CAS No | TSCA | TSCA Inventory notification - Active-Inactive | TSCA - EPA Regulatory Flags |
|---|---|---|---|---|
| L-Limonene | 5989-54-8 | X | ACTIVE | - |
| D-Limonene | 5989-27-5 | X | ACTIVE | - |
| p-Cymene | 99-87-6 | X | ACTIVE | - |
| 1,8-Cineol | 470-82-6 | X | ACTIVE | - |

**Legend:**
**TSCA** US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

**TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT)** Not applicable

**TSCA 12(b)** - Notices of Export Not applicable

**International Inventories**
China, X = listed, Australia, U.S.A. (TSCA), Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Australia (AICS), Korea (KECL), China (IECSC), Japan (ENCS), Philippines (PICCS), Taiwan (TCSI), Japan (ISHL), New Zealand (NZIoC), Japan (ISHL).

| Component | CAS No | DSL | NDSL | EINECS | PICCS | ENCS | ISHL | AICS | IECSC | KECL |
|---|---|---|---|---|---|---|---|---|---|---|
| L-Limonene | 5989-54-8 | X | - | 227-815-6 | X | X | X | X | X | - |
| D-Limonene | 5989-27-5 | X | - | 227-813-5 | X | X | X | X | X | KE-24397 |
| p-Cymene | 99-87-6 | X | - | 202-796-7 | X | X | X | X | X | KE-21748 |
| 1,8-Cineol | 470-82-6 | X | - | 207-431-5 | X | X | X | X | X | KE-34618 |

**KECL** - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

**U.S. Federal Regulations**

**SARA 313**
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

**SARA 311/312 Hazard Categories**
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

**CWA (Clean Water Act)** Not applicable

**Clean Air Act** Not applicable

**OSHA** - Occupational Safety and Health Administration Not applicable

**CERCLA**
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

**California Proposition 65** This product does not contain any Proposition 65 chemicals.

**U.S. State Right-to-Know Regulations**

| Component | Massachusetts | New Jersey | Pennsylvania | Illinois | Rhode Island |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| D-Limonene | - | - | - | X | - |
| p-Cymene | X | - | X | - | - |

**U.S. Department of Transportation**
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

**U.S. Department of Homeland Security** This product does not contain any DHS chemicals.

**Other International Regulations**

**Mexico - Grade** No information available

**Authorisation/Restrictions according to EU REACH**

| Component | CAS No | REACH (1907/2006) - Annex XIV - Substances Subject to Authorization | REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances | REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC) |
|---|---|---|---|---|
| L-Limonene | 5989-54-8 | - | Use restricted. See entry 75. (see link for restriction details) | - |
| D-Limonene | 5989-27-5 | - | Use restricted. See entry 75. (see link for restriction details) | - |
| p-Cymene | 99-87-6 | - | - | - |
| 1,8-Cineol | 470-82-6 | - | - | - |

**REACH links**
*https://echa.europa.eu/substances-restricted-under-reach*

**Safety, health and environmental regulations/legislation specific for the substance or mixture**

| Component | CAS No | OECD HPV | Persistent Organic Pollutant | Ozone Depletion Potential | Restriction of Hazardous Substances (RoHS) |
|---|---|---|---|---|---|
| L-Limonene | 5989-54-8 | Not applicable | Not applicable | Not applicable | Not applicable |
| D-Limonene | 5989-27-5 | Listed | Not applicable | Not applicable | Not applicable |
| p-Cymene | 99-87-6 | Listed | Not applicable | Not applicable | Not applicable |
| 1,8-Cineol | 470-82-6 | Not applicable | Not applicable | Not applicable | Not applicable |

**Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?**
Not applicable

**Other International Regulations**

| Component | CAS No | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification | Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements | Rotterdam Convention (PIC) | Basel Convention (Hazardous Waste) |
|---|---|---|---|---|---|
| L-Limonene | 5989-54-8 | Not applicable | Not applicable | Not applicable | Not applicable |
| D-Limonene | 5989-27-5 | Not applicable | Not applicable | Not applicable | Not applicable |
| p-Cymene | 99-87-6 | Not applicable | Not applicable | Not applicable | Not applicable |

| | | | | | |
|---|---|---|---|---|---|
| 1,8-Cineol | 470-82-6 | Not applicable | Not applicable | Not applicable | Not applicable |

## 16. Other Information

**Prepared By**
Product stewardship (Regulatory Affairs)
Thermo Fisher Scientific
email - begel.sdsdesk@thermofisher.com

**Creation Date** 22-Oct-2010
**Revision Date** 19-Dec-2025
**Print Date** 19-Dec-2025
**Revision Summary** Updated to the U.S. Department of Labor's Occupational Safety and Health Administration (OSHA) which published its Final Rule in the Federal Register revising the Hazard Communication Standard (HCS/HazCom), 29 CFR 1910.1200 (2024) (HCS §1910.1200, 2024), May 20, 2024, effective July 19, 2024.

**Disclaimer**

**The information provided in 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 guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered 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 materials or in any process, unless specified in the text**

**End of SDS**