

Material Safety Data Sheet

acc. to OSHA and ANSI

Printing date 05/11/2009

Reviewed on 05/11/2009

1 Identification of substance:**Product details:****Product name:** (+)-Limonene**Stock number:** 32174**Manufacturer/Supplier:**

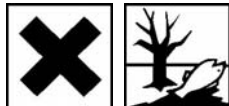
Alfa Aesar, A Johnson Matthey Company
 Johnson Matthey Catalog Company, Inc.
 30 Bond Street
 Ward Hill, MA 01835-8099
 Emergency Phone: (978) 521-6300
 CHEMTREC: (800) 424-9300
 Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department**Emergency information:**

During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:**Chemical characterization:****Description: (CAS#)**

(+)-Limonene (CAS# 5989-27-5): 100%

Identification number(s):**EINECS Number:** 227-813-5**Index number:** 601-029-00-7**3 Hazards identification****Hazard description:**

Xi Irritant
 N Dangerous for the environment

Information pertaining to particular dangers for man and environment

R 10 Flammable.

R 38 Irritating to skin.

R 43 May cause sensitization by skin contact.

R 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Classification system**HMIS ratings (scale 0-4)****(Hazardous Materials Identification System)**

HEALTH	1
FIRE	2
REACTIVITY	1

Health (acute effects) = 1
 Flammability = 2
 Reactivity = 1

GHS label elements**Warning**

2.6/3 - Flammable liquid and vapour.

**Warning**

4.1/1 - Very toxic to aquatic life with long lasting effects.

**Warning**

3.2/2 - Causes skin irritation.

3.4/1 - May cause an allergic skin reaction.

Prevention:

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.

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Take precautionary measures against static discharge.
 Avoid breathing dust/fume/gas/mist/vapours/spray.
 Wash thoroughly after handling.
 Contaminated work clothing should not be allowed out of the workplace.
 Avoid release to the environment.
 Wear protective gloves/protective clothing/eye protection/face protection.

Response:

IF ON SKIN: Wash with plenty of soap and water.
 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
 Specific treatment (see label).
 If skin irritation occurs: Get medical advice/attention.
 If skin irritation or rash occurs: Get medical advice/attention.
 Take off contaminated clothing and wash before reuse.
 Wash contaminated clothing before reuse.
 In case of fire: Use for extinction: CO₂, powder or water spray.
 Collect spillage.

Storage:

Store in a well-ventilated place. Keep cool.

Disposal:

Dispose of contents/container in accordance with local/regional/national/international regulations.

4 First aid measures**After inhalation**

Supply fresh air and to be sure call for a doctor.
 Supply fresh air. If required, provide artificial respiration. Keep patient warm.
 Seek immediate medical advice.

After skin contact

Immediately wash with water and soap and rinse thoroughly.
 Seek immediate medical advice.

After eye contact

Rinse opened eye for several minutes under running water. Then consult a doctor.

After swallowing Seek immediate medical advice.

5 Fire fighting measures**Suitable extinguishing agents**

Use carbon dioxide, extinguishing powder or foam. Water may be ineffective but may be used for cooling exposed containers.

Special hazards caused by the material, its products of combustion or resulting gases:

In case of fire, the following can be released:

Carbon monoxide and carbon dioxide

Protective equipment:

Wear self-contained respirator.
 Wear fully protective impervious suit.

6 Accidental release measures**Person-related safety precautions:**

Wear protective equipment. Keep unprotected persons away.
 Ensure adequate ventilation
 Keep away from ignition sources

Measures for environmental protection:

Do not allow material to be released to the environment without proper governmental permits.

Measures for cleaning/collecting:

Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).

Keep away from ignition sources.

Additional information:

See Section 7 for information on safe handling
 See Section 8 for information on personal protection equipment.
 See Section 13 for disposal information.

7 Handling and storage**Handling****Information for safe handling:**

Keep container tightly sealed.
 Store in cool, dry place in tightly closed containers.
 Ensure good ventilation at the workplace.

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Information about protection against explosions and fires:

Keep ignition sources away.
Protect against electrostatic charges.
Fumes can combine with air to form an explosive mixture.

Storage

Requirements to be met by storerooms and receptacles: No special requirements.
Information about storage in one common storage facility: Store away from oxidizing agents.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection**Additional information about design of technical systems:**

Properly operating chemical fume hood designed for hazardous chemicals and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace: Not required.

Additional information: No data

Personal protective equipment**General protective and hygienic measures**

The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.
Avoid contact with the skin.
Avoid contact with the eyes and skin.

Breathing equipment: Use suitable respirator when high concentrations are present.

Protection of hands:

Impervious gloves
Check protective gloves prior to each use for their proper condition.

Material of gloves

The selection of suitable gloves not only depends on the material, but also on quality.
Quality will vary from manufacturer to manufacturer.

Eye protection: Safety glasses

Body protection: Protective work clothing.

9 Physical and chemical properties:**General Information**

Form:	Liquid
Color:	Colorless
Odor:	Fruit-like

Change in condition

Melting point/Melting range:	-96.6°C (-142°F)
Boiling point/Boiling range:	176°C (349°F)
Sublimation temperature / start:	Not determined

Flash point:	49°C (120°F)
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Ignition temperature:	Not determined
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Decomposition temperature:	Not determined
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Explosion limits:

Lower:	Not determined
Upper:	Not determined

Vapor pressure:	Not determined
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Density at 20°C (68°F):	0.8413 g/cm ³
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Solubility in / Miscibility with Water:	Not miscible or difficult to mix
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10 Stability and reactivity**Thermal decomposition / conditions to be avoided:**

Decomposition will not occur if used and stored according to specifications.

Materials to be avoided: Oxidizing agents

Dangerous reactions No dangerous reactions known

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Dangerous products of decomposition: Carbon monoxide and carbon dioxide**11 Toxicological information****Acute toxicity:****LD/LC50 values that are relevant for classification:**

Oral	LD50	5600 mg/kg (mouse)
		4400 mg/kg (rat)
Dermal	LD50	>5000 mg/kg (mam)
		>5000 mg/kg (rabbit)

Primary irritant effect:**on the skin:** Irritant to skin and mucous membranes.**on the eye:** Irritating effect.**Sensitization:** Sensitization possible through skin contact.**Other information (about experimental toxicology):**

Tumorigenic effects have been observed on tests with laboratory animals.

Reproductive effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:**Subacute to chronic toxicity:**

The Registry of Toxic Effects of Chemical Substances (RTECS) reports the following effects in laboratory animals:

Behavioral - changes in motor activity (specific assay).

Behavioral - excitement.

Behavioral - convulsions or effect on seizure threshold.

Behavioral - altered sleep time (including change in righting reflex).

Behavioral - somnolence (general depressed activity).

Nutritional and Gross Metabolic - body temperature decrease.

Kidney, Ureter, Bladder - changes in tubules (including acute renal failure, acute tubular necrosis).

Kidney, Ureter, Bladder - other changes in urine composition.

Kidney, Ureter, Bladder - other changes.

Kidney, Ureter, Bladder - changes in bladder weight.

Kidney, Ureter, Bladder - Kidney tumors.

Liver - changes in liver weight.

Gastrointestinal - tumors.

Related to Chronic Data - death.

Peripheral Nerve and Sensation - spastic paralysis with or without sensory change.

Lungs, Thorax, or Respiration - respiratory depression

Skin and Appendages - hair.

Reproductive - Tumorigenic effects - testicular tumors.

Reproductive - Specific Developmental Abnormalities - musculoskeletal system.

Reproductive - Effects on Newborn - growth statistics (e.g.%, reduced weight gain).

Reproductive - Effects on Newborn - physical.

Tumorigenic - protects against induction of experimental tumors.

Tumorigenic - active as anti-cancer agent.

Tumorigenic - carcinogenic by RTECS criteria.

Tumorigenic - equivocal tumorigenic agent by RTECS criteria.

Additional toxicological information:

To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

IARC-3: Not classifiable as to carcinogenicity to humans.

12 Ecological information:**Ecotoxicological effects:****Remark:** Very toxic for fish**General notes:**

Do not allow product to reach ground water, water course or sewage system.

Danger to drinking water if even small quantities leak into the ground.

Also poisonous for fish and plankton in water bodies.

Do not allow material to be released to the environment without proper governmental permits.

Very toxic for aquatic organisms

13 Disposal considerations**Product:****Recommendation** Consult state, local or national regulations to ensure proper disposal.

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Uncleaned packagings:**Recommendation:** Disposal must be made according to official regulations.**14 Transport information****DOT regulations:**

Hazard class: 3
Identification number: UN2052
Packing group: III
Proper shipping name (technical name): DIPENTENE
Label: 3

Land transport ADR/RID (cross-border)

ADR/RID class: 3 (F1) Flammable liquids
Danger code (Kemler): 30
UN-Number: 2052
Packaging group: III
Description of goods: 2052 DIPENTENE

Maritime transport IMDG:

IMDG Class: 3
UN Number: 2052
Label: 3
Packaging group: III
Proper shipping name: DIPENTENE

Air transport ICAO-TI and IATA-DGR:

ICAO/IATA Class: 3
UN/ID Number: 2052
Label: 3
Packaging group: III
Proper shipping name: DIPENTENE

UN "Model Regulation": UN2052, DIPENTENE, 3, III**Environmental hazards:** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID**15 Regulations****Product related hazard informations:****Hazard symbols:**

Xi Irritant
 N Dangerous for the environment

Risk phrases:

10 Flammable.
 38 Irritating to skin.
 43 May cause sensitization by skin contact.
 50/53 Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

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Safety phrases:

- 24 Avoid contact with skin.
37 Wear suitable gloves.
60 This material and its container must be disposed of as hazardous waste.
61 Avoid release to the environment. Refer to special instructions/Safety data sheets

National regulations

All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.
All components of this product are listed on the Canadian Domestic Substances List (DSL).

Information about limitation of use: For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

Department issuing MSDS: Health, Safety and Environmental Department.

Contact: Zachariah Holt

Abbreviations and acronyms:

ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
RID: Règlement international concernant le transport des marchandises dangereuses par chemin de fer (Regulations Concerning the International Transport of Dangerous Goods by Rail)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
IATA-DGR: Dangerous Goods Regulations by the "International Air Transport Association" (IATA)
ICAO: International Civil Aviation Organization
ICAO-TI: Technical Instructions by the "International Civil Aviation Organization" (ICAO)
GHS: Globally Harmonized System of Classification and Labelling of Chemicals
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent

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