

SAFETY DATA SHEET

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

1.1 Product identifiers

Product name : Tetrahydrofuran
CAS number : 109-99-9
Synonyms : THF

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

Identified uses : Industrial, Manufacturing or Laboratory use

1.3 Details of the supplier of the safety data sheet

Company : Lab Alley, LLC
22111 Highway 71 West, Suite 601
Spicewood, Texas 78669
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 2)
Acute toxicity, Oral (Category 4)
Eye irritation (Category 2A)
Carcinogenicity (Category 2)
Specific target organ toxicity - single exposure (Category 3) - Respiratory system, Central nervous system,

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word : **Danger**

Hazard statement(s) : Highly flammable liquid and vapor. Harmful if swallowed. Causes serious eye irritation. May cause respiratory irritation. May cause drowsiness or dizziness. Suspected of causing cancer.

Precautionary statement(s) : **Prevention** - Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. 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. Avoid breathing mist or vapors. Wash skin thoroughly after handling. Do not eat, drink or smoke when using this product. Use only outdoors or in a well-ventilated area. Wear protective gloves/ protective clothing/ eye protection/ face protection. **Response** - IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. IF exposed or concerned: Get medical advice/ attention. If eye irritation persists: Get medical advice/ attention. In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Potential Health Effects:

| Organ | Description |
|------------|--|
| Eyes | Causes eye irritation |
| Ingestion | May be harmful if swallowed. |
| Inhalation | May be harmful if inhaled. Material causes respirator tract irritation. Vapors may cause drowsiness/dizziness. |
| Skin | May be harmful if absorbed through skin. Causes skin burns. |

SECTION 3: Composition/information on ingredients

3.1 Components

Common name / Synonym: CAS number: Tetrahydrofuran/THF: 109-99-9
EINECS number: 203-726-8
ICSC number: 0578
RTECS #: LU5950000
UN #: UN2056
EC #: 603-025-00-0

| % Weight | Material | CAS |
|----------|-----------------|----------|
| 100 | Tetrahydrofuran | 109-99-9 |

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice : Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

If inhaled : Remove person to fresh air. If signs/symptoms continue, get medical attention. Give oxygen or artificial respiration as needed.

- | | | |
|--------------------------------|---|--|
| In case of skin contact | : | Wash skin with soap and copious amounts of water. Seek medical attention. |
| In case of eye contact | : | Thoroughly flush the eyes with large amounts of clean low-pressure water for at least 15 minutes, occasionally lifting the upper and lower eyelids. If irritation persists, seek medical attention. |
| If swallowed | : | DO NOT induce vomiting. If vomiting does occur, have victim lean forward to prevent aspiration. Rinse mouth with water. Seek medical attention. Never give anything by mouth to an unconscious individual. |

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2)

4.3 Indication of any immediate medical attention and special treatment needed

No data available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable (and unsuitable) extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Specific hazards arising from the substance or mixture

Carbon oxides expected to be the primary hazardous combustion product.

5.3 Special protective equipment and precautions for firefighters

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Keep unopened containers cool by spraying with water.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Do not inhale vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors can accumulate in low areas.

6.2 Environmental precautions

Stop leak / contain spill if possible and safe to do so. Prevent product from entering drains.

6.3 Methods and materials for containment and cleaning up

Contain spill, then collect with an electrically protected vacuum cleaner or by wet-brushing and put the material into a convenient waste disposal container. Keep container closed.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Test for peroxide formation periodically and before distillation.

Storage class

Storage class (TRGS 510): 3: Flammable liquids

8. Exposure controls/personal protection

8.1 Occupational exposure limits

Ingredients with workplace control parameters

| Component | CAS-No. | Value | Control parameters | Basis |
|-----------------|----------|--|----------------------------------|---|
| Tetrahydrofuran | 109-99-9 | TWA | 50 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | Remarks | Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption | | |
| | | STEL | 100 ppm | USA. ACGIH Threshold Limit Values (TLV) |
| | | Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption | | |
| | | ST | 250 ppm 735 mg/m ³ | USA. NIOSH Recommended Exposure Limits |
| | | TWA | 200 ppm 590 mg/m ³ | USA. NIOSH Recommended Exposure Limits |
| | | TWA | 200 ppm 590 mg/m ³ | USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants |
| | | PEL | 200 ppm 590 mg/m ³ | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |
| | | STEL | 250 ppm 735 mg/m ³ | California permissible exposure limits for chemical contaminants (Title 8, Article 107) |

Biological occupational exposure limits

| Component | CAS-No. | Parameters | Value | Biological specimen | Basis |
|-----------------|----------|--|--------|---------------------|---|
| Tetrahydrofuran | 109-99-9 | Tetrahydrofuran | 2 mg/l | Urine | ACGIH - Biological Exposure Indices (BEI) |
| Remarks | | End of shift (As soon as possible after exposure ceases) | | | |

Derived No Effect Level (DNEL)

| Application Area | Routes of exposure | Health effect | Value |
|------------------|--------------------|----------------------------|--------------|
| Workers | Skin contact | Long-term systemic effects | 25mg/kg BW/d |
| Consumers | Skin contact | Long-term systemic effects | 15mg/kg BW/d |
| Workers | Inhalation | Long-term local effects | 150 mg/m3 |
| Workers | Inhalation | Long-term systemic effects | 150 mg/m3 |
| Consumers | Inhalation | Long-term systemic effects | 62 mg/m3 |
| Consumers | Inhalation | Acute local effects | 150 mg/m3 |
| Consumers | Inhalation | Acute systemic effects | 150 mg/m3 |

Predicted No Effect Concentration (PNEC)

| Compartment | Value |
|-------------------------------|------------|
| Soil | 2.13 mg/kg |
| Sea water | 0.432 mg/l |
| Fresh water | 4.32 mg/l |
| Sea sediment | 2.33 mg/kg |
| Fresh water sediment | 23.3 mg/kg |
| Onsite sewage treatment plant | 4.6 mg/l |

8.2 Exposure controls

Appropriate engineering controls

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance

Personal protective equipment**Eye/face protection**

Use chemical safety goggles and/or a full face shield where splashing is possible. Use equipment approved by appropriate government standards, such as NIOSH (US) or EN166 (EU) Maintain eye wash fountain and quick-drench facilities in work area.

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection

Wear impervious, flame retardant, antistatic protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Respiratory protection

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

| | |
|--|-----------------------------------|
| Physical State | Liquid. |
| Appearance | Colorless, clear liquid. |
| Odor | No data available. |
| Odor Thresh | No data available. |
| pH | ca.7 - 8 |
| Melting Point/Range | -108.0 °C (-162.4 °F) |
| Boiling Point/Range | 65.0 - 67.0 °C (149.0 - 152.6 °F) |
| Flash Point | -14°C (6°F) - Closed Cup |
| Evaporation Rate | No data available. |
| Flammability (solid, gas) | Flammable. |
| Flammability or explosive limit | |
| | Upper : 11.8% (V) |
| | Lower : 2% (V) |

| | |
|-----------------------|---|
| Vapor Pressure | 152.0 hPa (114.0 mmHg) at 15.0 °C (59.0 °F) 190.7 hPa (143.0 mmHg) at 20.0 °C (68.0 °F) 213.3 hPa (160.0 mmHg) at 25.0 °C (77.0 °F) 373.3 hPa (280.0 mmHg) at 38.0 °C (100.4 °F) |
| Vapor | 2.1 |
| Density | 1.049 g/mL at 25 °C (77 °F) |
| Solubility | Soluble in water. |

| | |
|---|--|
| Partition coefficient; n-octanol/water | log Pow: 0.45 at 25 °C (77 °F) - Bio-accumulation is not expected. |
| Autoignition Temp | 321.0 °C (609.8 °F) |
| Decomposition Temp | No data available. |
| Viscosity | No data available. |
| Molecular Formula | C ₄ H ₈ O |
| Molecular Weight | 72.11 g/mol |
| VOC Content(%) | No data available. |
| Oxidizing properties | Not oxidizing. |

9.2 Other safety information

No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity

Formation of peroxides possible. Vapors may form explosive mixture with air.

10.2 Chemical stability

Sensitivity to light. Sensitive to air. The product is chemically stable under standard ambient conditions (room temperature) . Stable under recommended storage conditions. Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

10.3 Possibility of hazardous reactions

Vapors may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks. Extreme temperatures and direct sunlight.

10.5 Incompatible materials

Oxidizing agents, oxygen.

10.6 Hazardous decomposition products

Hazardous decomposition products formed under fire conditions. -
Carbon oxides.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Product Information, Component Information:

No data available for the teratogenic, mutagenic, or reproductive toxicity effects of this product.

Acute Toxicity:

| | | | |
|-------------------|------------|--------------|----|
| LC50 (Inhalation) | Rat | 21000 ppm | 3h |
| LD50 (Dermal) | Rat | > 2000 mg/kg | |
| LD50 (Oral) | Rat | 1650 mg/kg | |
| LD50 (Oral) | Guinea pig | 2300 mg/kg | |

Skin corrosion/irritation

Rabbit - skin irritation

Serious eye damage/eye irritation

Rabbit - Serious risk of eye damage

Respiratory or skin sensitization

| | |
|---------------------------|--------------------|
| Respiratory sensitization | No data available. |
| Skin sensitization | No data available. |

Germ cell mutagenicity

No data available.

Carcinogenicity

| | |
|--------------|--|
| IARC | No components of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. |
| ACGIH | No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH. |
| NTP | No components of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP. |
| OSHA | No components of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA. |

Reproductive toxicity

No data available.

Specific target organ toxicity - single exposure

Inhalation - May cause respiratory irritation. - Central nervous system. Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2) May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure

No data available.

Aspiration hazard

No data available.

Chronic effects

No data available.

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 4 Weeks

RTECS: LU5950000

Irritant effects, Cough, Shortness of breath, narcosis, somnolence. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. In high doses: somnolence, narcosis.

Other dangerous properties can not be excluded. This substance should be handled with particular care. Stomach - Irregularities - Based on Human Evidence

12. Ecological information

12.1 Toxicity

| | |
|--|--|
| Toxicity to fish | flow-through test LC50 - Pimephales promelas (fathead minnow) - 2,160 mg/l - 96 h (OECD Test Guideline 203) |
| Toxicity to daphnia and other aquatic invertebrates | static test EC50 - Daphnia magna (Water flea) - 3,485 mg/l - 48 h (OECD Test Guideline 202) |
| Toxicity to fish(Chronic toxicity) | flow-through test NOEC - Pimephales promelas (fathead minnow) - 216 mg/l - 33 d Remarks: (ECHA) |

12.2 Persistence and degradability

| | |
|-------------------------|---|
| Biodegradability | Aerobic Biochemical oxygen demand - Exposure time 28 d Result: 39 % - Not readily biodegradable. (OECD Test Guideline 301D) |
|-------------------------|---|

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

No data available.

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.

| | |
|-----------------------|---|
| Waste Residues | Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container or residue. |
|-----------------------|---|

| | |
|---------------------------|--|
| Product Containers | Users should review their operations in terms of the applicable federal/national or local regulations and consult with appropriate regulatory agencies if necessary before disposing of waste product container. |
|---------------------------|--|

The information offered in section 13 is for the product as shipped. Use and/or alterations to the product may significantly change the characteristics of the material and alter the waste classification and proper disposal methods.

SECTION 14: Transport information

DOT (US)

UN number: 2056 Class: 3

Packing group: II

Proper shipping name: Tetrahydrofuran

Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2056 Class: 3

Proper shipping name: TETRAHYDROFURAN

Packing group: II

EMS-No: F-E, S-D

IATA

UN number: 2056 Class: 3

Proper shipping name: Tetrahydrofuran

Packing group: II

SECTION 15: Regulatory information**OSHA Hazards**

Flammable liquid, Harmful by ingestion, Irritant, Target organ effect

All ingredients are on the following inventories or are exempted from listing.

| Country | Notification |
|--------------------------|--------------|
| Australia | AICS |
| Canada | DSL |
| China | IECS |
| European Union | EINECS |
| Japan | ENCS/ISHL |
| Korea | ECL |
| New Zealand | NZIoC |
| Philippines | PICCS |
| United States of America | TSCA |

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Chronic Health Hazard

Fire Hazard

Massachusetts Right To Know Components

Tetrahydrofuran CAS-No. 109-99-9 Revision Date 2007-03-01

Pennsylvania Right To Know Components

Tetrahydrofuran CAS-No. 109-99-9 Revision Date 2007-03-01

New Jersey Right To Know Components

Tetrahydrofuran CAS-No. 109-99-9 Revision Date 2007-03-01

California Prop 65 Components

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

SECTION 16: Other information

| | |
|---------------|------------|
| Issue Date | 05/20/2015 |
| Revision Date | 06/14/2023 |

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.