

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; Diethylene oxide; Furanidine |

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 2 |
| Acute Oral Toxicity | Category 4 |
| Serious Eye Damage/Eye Irritation | Category 2 |
| Carcinogenicity | Category 2 |
| Specific Target Organ Toxicity (single exposure) | Category 3 |
| Target Organ(s) - Respiratory system, Central nervous system (CNS) | |

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word

Danger

Hazard statements

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 statements

Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wash face, hands, and any exposed skin thoroughly after handling. Do not eat, drink, or smoke when using this product. Wear eye/face protection. Do not breathe dust/fume/gas/mist/vapors/spray. Use only outdoors or in a well-ventilated area. 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. Keep cool.

Response: IF exposed or concerned, get medical attention/advice.

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.

IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.

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 SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell. Rinse mouth.

Fire: In case of fire, use CO₂, dry chemical, or foam for extinction.

Storage: Store locked up. Store in a well-ventilated place. Keep container tightly closed.

Disposal: Dispose of contents/container to an approved waste disposal plant.

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

May form explosive peroxides.
WARNING: Cancer.

SECTION 3: Composition/information on ingredients

3.1 Components

| Chemical name | Common name and synonyms | CAS number | Concentration |
|-----------------|-----------------------------------|------------|---------------|
| Tetrahydrofuran | THF; Diethylene oxide; Furanidine | 109-99-9 | <=100% |

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice

- 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

Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea, and vomiting. Causes central nervous system depression.

4.3 Indication of any immediate medical attention and special treatment needed

If symptoms persist, call a physician. Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media Water spray, carbon dioxide (CO₂), dry chemical, alcohol-resistant foam. Water mist maybe used to cool closed containers.

Unsuitable extinguishing media Water may be ineffective.

5.2 Specific hazards arising from the substance or mixture

Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. May form explosive peroxides. Hazardous Combustion Products: Carbon monoxide (CO). Carbon dioxide (CO₂). Peroxides.

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 -14°C (6°F) - Closed Cup

Autoignition Temperature 321.0 °C (609.8 °F)

Explosion limits

Upper 11.8% (V)

Lower 2% (V)

Sensitivity to Mechanical Impact No information available.

Sensitivity to Static Discharge No information available.

NFPA

| Health | Flammability | Instability | Physical hazards |
|--------|--------------|-------------|------------------|
| 2 | 3 | 1 | N/A |

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

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

6.2 Environmental precautions

Should not be released into the environment.

6.3 Methods and materials for containment and cleaning up

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

6.4 Reference to other sections

See Section 2 for full list of hazard and precaution statements.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Precautions on 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

Handle in accordance with good industrial hygiene and safety practice.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Flammables area. 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.

Incompatibilities

Strong oxidizing agents. Acids.

SECTION 8: Exposure controls/personal protection

8.1 Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

| Component | Type | Value | |
|-----------------|----------------|---------|-----------------------|
| Tetrahydrofuran | (Vacated) TWA | 200 ppm | 590 mg/m ³ |
| | (Vacated) STEL | 250 ppm | 735 mg/m ³ |
| | TWA | 200 ppm | 590 mg/m ³ |

US. ACGIH Threshold Limit Values

| Component | Type | Value |
|-----------------|------|---------|
| Tetrahydrofuran | TWA | 50 ppm |
| | STEL | 100 ppm |

US. NIOSH: Pocket Guide to Chemical Hazards

| Component | Type | Value | |
|-----------------|------|----------|-----------------------|
| Tetrahydrofuran | IDLH | 2000 ppm | |
| | TWA | 200 ppm | 590 mg/m ³ |
| | STEL | 250 ppm | 735 mg/m ³ |

ACGIH Biological Exposure Indices

| Component | Parameter | Specimen | Value |
|-----------------|-----------------|----------|--------|
| Tetrahydrofuran | Tetrahydrofuran | Urine | 2 mg/L |

8.2 Exposure controls

Appropriate engineering controls

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

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 protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

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: Type A. Organic gases and vapours filter. Brown. Conforming to EN14387.

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 |
| Odor | No information available |
| Odor Threshold | No information 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) |
| Evaporation Rate | No information available |

| | |
|---|---|
| Flammability (solid) | Not applicable |
| Flammability or explosive limit | |
| Upper | 11.8% (V) |
| Lower | 2% (V) |
| Vapor Pressure | 190.7 hPa (143.0 mmHg) at 20.0 °C (68.0 °F) |
| Vapor Density | 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) |
| Autoignition Temp | 321.0 °C (609.8 °F) |
| Decomposition Temp | No information available |
| Viscosity | No information available |
| Molecular Formula | C4H8O |
| Molecular Weight | 72.11 g/mol |
| VOC Content(%) | No information available |
| Oxidizing properties | Not oxidizing |

9.2 Other safety information

No information available.

SECTION 10: Stability and reactivity

10.1 Reactivity

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

10.2 Chemical stability

Stable under recommended storage conditions. Reacts with air to form peroxides. May form explosive peroxides on prolonged storage. Hygroscopic.

10.3 Possibility of hazardous reactions

None under normal processing.

10.4 Conditions to avoid

Incompatible products. Excess heat. Keep away from open flames, hot surfaces, and sources of ignition. Exposure to moist air or water.

10.5 Incompatible materials

Strong oxidizing agents, Acids.

10.6 Hazardous decomposition products

Carbon monoxide (CO), Carbon dioxide (CO₂), peroxides.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Product Information, Component Information

Acute toxicity

| Component | LD50 Oral | LD50 Dermal | LC50 Inhalation |
|-----------------|------------------|-----------------------|---|
| Tetrahydrofuran | 1650 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | 180 mg/L (Rat) 1 h 53.9 mg/L (Rat) 4 h |

Skin corrosion/irritation

No information available.

Serious eye damage/eye irritation

Irritating to eyes.

Respiratory or skin sensitization

May cause irritation of respiratory tract.

Germ cell mutagenicity

No information available.

Carcinogenicity

| Component | CAS | IARC | NTP | ACGIH | OSHA | Mexico |
|-----------------|----------|----------|------------|-------|------|--------|
| Tetrahydrofuran | 109-99-9 | Group 2B | Not listed | A3 | X | A3 |

Specific target organ toxicity - single exposure

Respiratory system, Central nervous system (CNS).

Specific target organ toxicity - repeated exposure

None known.

Reproductive toxicity

No information available.

Chronic effects

Symptoms of overexposure may be headache, dizziness, tiredness, nausea, and vomiting. Causes central nervous system depression.

11.2 Additional Information

The toxicological properties have not been fully investigated.

SECTION 12: Ecological information

12.1 Toxicity

Do not empty into drains.

| Product | | Species | Test Results |
|-----------------|------|---------------------|---------------|
| Tetrahydrofuran | LC50 | Pimephales promelas | 2160 mg/L/96h |
| | LC50 | Leuciscus idus | 2820 mg/L/48h |

| | | | |
|-----------------|------|------------|----------------------------------|
| tetrahydrofuran | EC50 | Water Flea | 3485 mg/L/48h >10000 mg/L/24h |
|-----------------|------|------------|----------------------------------|

12.2 Persistence and degradability

Persistence is unlikely based on information available.

12.3 Bio accumulative potential

No information available.

12.4 Mobility in soil

Will likely be mobile in the environment due to its volatility.

12.5 Results of PBT and vPvB assessment

No information available.

12.6 Endocrine disrupting properties

Listed as a Group III Chemical on the EU Endocrine Disrupters Candidate List.

12.7 Other adverse effects

No information available.

SECTION 13: Disposal considerations

13.1 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.

| Component | RCRA - U Series Wastes | RCRA - P Series Wastes |
|----------------------------|------------------------|------------------------|
| Tetrahydrofuran - 109-99-9 | U213 | - |

SECTION 14: Transport information

DOT (US)

| | |
|----------------------|-----------------|
| UN-no | UN2056 |
| Proper Shipping Name | TETRAHYDROFURAN |
| Hazard Class | 3 |
| Packing Group | II |

IMDG

| | |
|----------------------|-----------------|
| UN-no | UN2056 |
| Proper Shipping Name | TETRAHYDROFURAN |
| Hazard Class | 3 |
| Packing Group | II |

IATA

| | |
|----------------------|-----------------|
| UN-no | UN2056 |
| Proper Shipping Name | TETRAHYDROFURAN |
| Hazard Class | 3 |
| Packing Group | II |

SECTION 15: Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

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

Not applicable.

CERCLA Hazardous Substance List (40 CFR 302.4)

Listed, Tetrahydrofuran (CAS #109-99-9), RQ: 1000 lb.

SARA 304 Emergency release notification

Not regulated.

OSHA Specifically Regulated Substances (29 CFR 1910.1001-1053)

Not regulated.

Superfund Amendments and Reauthorization Act of 1986 (SARA)

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous

See Section 2 for more information.

SARA 313 (TRI reporting)

Not regulated.

Other federal regulations

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

Not regulated.

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

Not regulated.

Safe Drinking Water Act

Not regulated.

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

Not listed.

US state regulations

US. Massachusetts RTK - Substance List

Listed, Tetrahydrofuran (CAS #109-99-9).

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

Listed, Tetrahydrofuran (CAS #109-99-9).

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

Listed, Tetrahydrofuran (CAS #109-99-9).

California Proposition 65

Listed, Tetrahydrofuran (CAS #109-99-9).

SECTION 16: Other information

Issue date: 05/20/2015

Revision 1: 06/14/2023

Revision 2: 11/12/2024

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.