

SAFETY DATA SHEET

Creation Date 11-Jun-2009

Revision Date 23-Feb-2022

Revision Number 7

1. Identification

Product Name Tetrahydrofuran

Cat No. : AC610450000; AC610450010; AC610451000

CAS No 109-99-9
Synonyms THF

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-ACROS-01 / **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 by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|---|------------|
| 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 Organs - Respiratory system, Central nervous system (CNS). | |

Label Elements

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

Inhalation

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

Skin

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

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: 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

Hazards not otherwise classified (HNOC)

May form explosive peroxides

WARNING. Cancer - <https://www.p65warnings.ca.gov/>.

3. Composition/Information on Ingredients

| Component | CAS No | Weight % |
|-----------------|----------|----------|
| Tetrahydrofuran | 109-99-9 | >95 |

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. |
| Ingestion | Clean mouth with water and drink afterwards plenty of water. |
| Most important symptoms and effects | Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Causes central nervous system depression |
| Notes to Physician | Treat symptomatically |

5. Fire-fighting measures

| | |
|---|---|
| Suitable Extinguishing Media | Water spray, carbon dioxide (CO ₂), dry chemical, alcohol-resistant foam. Water mist may be used to cool closed containers. |
| Unsuitable Extinguishing Media | Water may be ineffective |
| Flash Point | -21 °C / -5.8 °F |
| Method - | No information available |
| Autoignition Temperature | 215 °C / 419 °F |
| Explosion Limits | |
| Upper | 11.8% |
| Lower | 2.0% |
| 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. May form explosive peroxides.

Hazardous Combustion Products

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

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
2

Flammability
3

Instability
1

Physical hazards
N/A

6. Accidental release measures

| | |
|----------------------------------|--|
| Personal Precautions | Use personal protective equipment as required. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges. |
| Environmental Precautions | Should not be released into the environment. |

Methods for Containment and Clean 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.

7. Handling and storage

Handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Ensure adequate ventilation. Avoid ingestion and inhalation. If peroxide formation is suspected, do not open or move container. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage.

Shelf life 6 months. May form explosive peroxides on prolonged storage. Containers should be dated when opened and tested periodically for the presence of peroxides. Should crystals form in a peroxidizable liquid, peroxidation may have occurred and the product should be considered extremely dangerous. In this instance, the container should only be opened remotely by professionals. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area. Store under an inert atmosphere. Incompatible Materials. Strong oxidizing agents. Acids.

8. Exposure controls / personal protection

Exposure Guidelines

| Component | ACGIH TLV | OSHA PEL | NIOSH IDLH | Mexico OEL (TWA) |
|-----------------|--------------------------------------|--|--|--|
| Tetrahydrofuran | TWA: 50 ppm STEL: 100 ppm Skin | (Vacated) TWA: 200 ppm (Vacated) TWA: 590 mg/m ³ (Vacated) STEL: 250 ppm (Vacated) STEL: 735 mg/m ³ TWA: 200 ppm TWA: 590 mg/m ³ | IDLH: 2000 ppm TWA: 200 ppm TWA: 590 mg/m ³ STEL: 250 ppm STEL: 735 mg/m ³ | TWA: 200 ppm TWA: 590 mg/m ³ STEL: 250 ppm STEL: 735 mg/m ³ |

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

OSHA - Occupational Safety and Health Administration

NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

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 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.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State
Appearance
Odor

Liquid
Colorless
Petroleum distillates

| | |
|--|---------------------------|
| Odor Threshold | No information available |
| pH | 7-8 20% aq. solution |
| Melting Point/Range | -108.4 °C / -163.1 °F |
| Boiling Point/Range | 66 °C / 150.8 °F |
| Flash Point | -21 °C / -5.8 °F |
| Evaporation Rate | > 1 |
| Flammability (solid,gas) | Not applicable |
| Flammability or explosive limits | |
| Upper | 11.8% |
| Lower | 2.0% |
| Vapor Pressure | 170 mbar @ 20 °C |
| Vapor Density | 2.5 |
| Specific Gravity | 0.880 |
| Solubility | miscible |
| Partition coefficient; n-octanol/water | No data available |
| Autoignition Temperature | 215 °C / 419 °F |
| Decomposition Temperature | No information available |
| Viscosity | 0.456 mPas @ 20°C Dynamic |
| Molecular Formula | C4 H8 O |
| Molecular Weight | 72.11 |

10. Stability and reactivity

| | |
|---|---|
| Reactive Hazard | Yes. |
| Stability | May form explosive peroxides. Check peroxide level periodically and if > 100 ppm 'DO NOT USE'. Hygroscopic. |
| Conditions to Avoid | Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition. Exposure to moist air or water. |
| Incompatible Materials | Strong oxidizing agents, Acids |
| Hazardous Decomposition Products | Carbon monoxide (CO), Carbon dioxide (CO ₂), peroxides |
| Hazardous Polymerization | Hazardous polymerization may occur. |
| Hazardous Reactions | None under normal processing. |

11. Toxicological information

Acute Toxicity

Product Information

Component Information

| 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 |

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

| | |
|------------------------|--|
| Irritation | Irritating to eyes May cause irritation of respiratory tract |
| Sensitization | No information available |
| Carcinogenicity | Limited evidence of a carcinogenic effect. |

| Component | CAS No | IARC | NTP | ACGIH | OSHA | Mexico |
|-----------------|----------|----------|------------|-------|------|--------|
| Tetrahydrofuran | 109-99-9 | Group 2B | Not listed | A3 | X | A3 |

ACGIH: (American Conference of Governmental Industrial

A1 - Known Human Carcinogen

Hygienists)

A2 - Suspected Human Carcinogen
 A3 - Animal Carcinogen
 ACGIH: (American Conference of Governmental Industrial Hygienists)

| | |
|---|--|
| Mutagenic Effects | No information available |
| Reproductive Effects | No information available. |
| Developmental Effects | No information available. |
| Teratogenicity | No information available. |
| STOT - single exposure | Respiratory system Central nervous system (CNS) |
| STOT - repeated exposure | None known |
| Aspiration hazard | No information available |
| Symptoms / effects, both acute and delayed | Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Causes central nervous system depression |

Endocrine Disruptor Information

| Component | EU - Endocrine Disruptors Candidate List | EU - Endocrine Disruptors - Evaluated Substances | Japan - Endocrine Disruptor Information |
|-----------------|--|--|---|
| Tetrahydrofuran | Group III Chemical | Not applicable | Not applicable |

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

12. Ecological information

Ecotoxicity

Do not empty into drains.

| Component | Freshwater Algae | Freshwater Fish | Microtox | Water Flea |
|-----------------|------------------|---|------------|--|
| Tetrahydrofuran | Not listed | 2160 mg/l LC50 = 96 h Pimephales promelas Leuciscus idus: LC50: 2820 mg/L/48h | Not listed | EC50 48 h 3485 mg/l EC50: >10000 mg/L/24h |

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

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

| Component | log Pow |
|-----------------|---------|
| Tetrahydrofuran | 0.45 |

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.

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

14. Transport information

DOT

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

TDG

| | |
|--------------|--------|
| 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 |
| IMDG/IMO | |
| UN-No | UN2056 |
| Proper Shipping Name | TETRAHYDROFURAN |
| Hazard Class | 3 |
| Packing Group | II |

15. Regulatory information

United States of America Inventory

| Component | CAS No | TSCA | TSCA Inventory notification - Active-Inactive | TSCA - EPA Regulatory Flags |
|-----------------|----------|------|---|-----------------------------|
| Tetrahydrofuran | 109-99-9 | 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

| Component | CAS No | TSCA 12(b) - Notices of Export |
|-----------------|----------|---|
| Tetrahydrofuran | 109-99-9 | Section 4, 1 % de minimus concentration |

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

| Component | CAS No | DSL | NDSL | EINECS | PICCS | ENCS | ISHL | AICS | IECSC | KECL |
|-----------------|----------|-----|------|-----------|-------|------|------|------|-------|----------|
| Tetrahydrofuran | 109-99-9 | X | - | 203-726-8 | X | X | X | X | X | KE-33454 |

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

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

| Component | Hazardous Substances RQs | CERCLA EHS RQs |
|-----------|--------------------------|----------------|
| | | |

| | | |
|-----------------|---------|---|
| Tetrahydrofuran | 1000 lb | - |
|-----------------|---------|---|

California Proposition 65 This product contains the following Proposition 65 chemicals.

| Component | CAS No | California Prop. 65 | Prop 65 NSRL | Category |
|-----------------|----------|---------------------|--------------|------------|
| Tetrahydrofuran | 109-99-9 | Carcinogen | - | Carcinogen |

U.S. State Right-to-Know Regulations

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

U.S. Department of Transportation

Reportable Quantity (RQ): Y
 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 Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

| Component | 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) |
|-----------------|---|---|---|
| Tetrahydrofuran | - | Use restricted. See item 75. (see link for restriction details) | - |

<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) |
|-----------------|----------|----------|------------------------------|---------------------------|--|
| Tetrahydrofuran | 109-99-9 | Listed | Not applicable | Not applicable | Not applicable |

| 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) |
|-----------------|----------|---|--|----------------------------|------------------------------------|
| Tetrahydrofuran | 109-99-9 | Not applicable | Not applicable | Not applicable | Not applicable |

16. Other information

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Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

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