Safety Data Sheet

Tetrahydrofuran

1 PRODUCT AND COMPANY IDENTIFICATION

Product Identifier: Tetrahydrofuran Tetrahydrofuran
Synonyms: Oxide, THF THF
Common Name: THF
SDS Number:
Revision Date: 1/26/2021
Version: 3
CAS Number: 109-99-9
Chemical Formula: C4H8O

Supplier Details:
Silver Fern Chemical, Inc.
121 W. De La Guerra Street, Suite B
Santa Barbara, CA 93101 USA

Customer Service:
1-866-282-3384
info@silverfernchemical.com

EMERGENCY TELEPHONE NUMBER: INFOTRAC 800-535-5053 (USA and Canda)
Outside USA & Canada 1-352-323-3500

2 HAZARDS IDENTIFICATION

Classification of the Substance or Mixture

GHS Classification in Accordance with 29 CFR 1910 (OSHA HCS):

Physical, Flammable Liquids, 2
Health, Acute toxicity, 4 Oral
Health, Serious Eye Damage/Eye Irritation, 1
Health, Specific target organ toxicity - Single exposure, 3

GHS Label Elements, Including Precautionary Statements

GHS Signal Word: DANGER

GHS Hazard Pictograms:

GHS Hazard Statements:

H225 - Highly flammable liquid and vapor
H302 - Harmful if swallowed
H318 - Causes serious eye damage
H335 - May cause respiratory irritation
H336 - May cause drowsiness or dizziness

GHS Precautionary Statements:

P210 - Keep away from heat/sparks/open flames/hot surfaces. No smoking
P233 - Keep container tightly closed.
P241 - Use explosion-proof electrical/ventilating/light/equipment.
P261 - Avoid breathing dust/fume/gas/mist/vapors/spray.
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P370+378 - In case of fire: Use dry chemical, carbon dioxide, water spray, or alcohol resistant foam for extinction.
P301+312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
P303+361+353 - IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305+351+338 - IF IN EYES: Rinse continuously with water for several minutes. Remove contact lenses if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor/physician.
P403+233 - Store in a well ventilated place. Keep container tightly closed.
P405 - Store locked up.

3 COMPOSITION/INFORMATION OF INGREDIENTS

Chemical Ingredients		
CAS#	%	Chemical Name
109-99-9	>99.0%	Tetrahydrofuran

4 FIRST AID MEASURES

Inhalation:
Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Do not leave the victim unattended.
Keep patient warm and at rest.
Get immediate medical advice/attention.
If breathing is difficult, give oxygen.
If breathing has stopped, apply artificial respiration.

Skin Contact:
In case of contact, immediately flush skin with soap and plenty of water.
Remove/Take off immediately all contaminated clothing.
Get medical attention immediately if irritation develops and persists.

Eye Contact:
Rinse immediately with plenty of water for at least 15 minutes.
Remove contact lenses, if present and easy to do.
Continue rinsing.
Seek immediate medical attention, preferably and opthalmologist.

Ingestion:
Rinse mouth with water.
If conscious, drink plenty of water.
Do NOT induce vomiting.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If a person vomits when lying on his back, place him in the recovery position.
Get immediate medical advice/attention.

General Advice
Take proper precautions to ensure your own health and safety before attempting rescue and providing first aid. For specific information refer to the Emergency Overview in Section 2 of this SDS.

5 FIRE FIGHTING MEASURES

Flash Point: -6.2 F (-21.2 C)
Flash Point Method: Abel-Pensky method
Autoignition Temp: ~ 419 F (215 C)
LEL: ~ 2 vol%
UEL: ~ 11 vol%

Fire fighting
Suitable extinguishing media:
SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam
LARGE FIRE: Use water spray, water fog or alcohol-resistant foam

Unsuitable extinguishing media: Do not use solid water stream

Protective equipment and precautions for firefighters
Specific hazards during fire fighting:
Fine spray/mists may be combustible at temperatures below normal flash point.
When mixed with air and exposed to iginition source, vapors can burn in open or explode in confined spaces.
Vapors may be heaver than air.
May travel long distances along the ground before igniting and flashing back to vapor source.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Move containers from fire area if it can be done without risk.
Cool containers with flooding quantities of water until well after fire is out.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
Always stay away from tanks engulfed in fire.
For massive fire, use unmanned hose holders or monitor nozzles; if this is possible, withdraw from area and let fire burn.

Special protective equipment for fire fighters:

Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighter's protective clothing will only provide limited protection.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions:
Use personal protective equipment.
Ensure adequate ventilation.
Remove all sources of ignition.
Evacuate personnel to safe area.
Beware of vapors accumulating to form explosive concentrations.
Vapors can accumulate in low areas.

Environmental Precautions:
Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.

Methods for containment / methods for cleaning up:
Elminate all sources of ignition.
All equipment used when handling this product must be grounded.
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
Prevent entry into waterways, sewers, basements or confined areas.
A vapor suppressing foam may be used to reduce vapors.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Use clean non-sparking tools to collect absorbed material.

7 HANDLING AND STORAGE

Handling Precautions:

ADVICE ON SAFE HANDLING:
For industrial use only.
Keep container tightly closed when not in use.
Extinguish all ignition sources.
Wear recommended personal protective equipment.
Containers must be properly grounded before beginning transfer.
All electrical equipment should be grounded and conform to applicable electric codes and regulatory requirements.
Check atmosphere for explosiveness and oxygen deficiencies.
Observe precautions pertaining to confined space entry.
Carefully vent any internal pressure before removing closure.
Handle empty container with care; vapor/residue may be flammable.
Avoid contact with skin and eyes.
Smoking, eating and drinking should be prohibited in the application area.
Take precautionary measures against static discharges.

Storage Requirements:

REQUIREMENTS FOR STORAGE AREAS AND CONTAINERS:

Store closed drums with bung in up position.
Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.
Can self-react/polymerize/liberate heat/raising temperature, pressure/possibly rupture container unless properly inhibited.
Storage in carbon steel is recommended.

8 EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls:

ENGINEERING MEASURES:
Electrical equipment should be grounded and conform to applicable electrical code.
Provide local exhaust or general room ventilation to minimize exposure to vapors.
Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures.

Personal Protective Equipment:

RESPIRATORY PROTECTION:
If exposure can potentially exceed the exposure limit(s), respiratory protection recommended or approved by appropriate local, state or international agency must be used.

EYE AND FACE PROTECTION:
Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor.

SKIN AND BODY PROTECTION:
Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn.

HYGIENE MEASURES:
Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.
Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.
Wash hands before eating, drinking, smoking, or using toilet facilities.
Use good personal hygiene practices.
Take off contaminated clothing and wash before reuse.
When using do not eat, drink or smoke.

Exposure Controls / personal protection

Control parameters

Ingredients with workplace control parameters

Occupational Exposure Limits

Ingredients	CAS-No.	Type	Limit Value	Basis Revision Date
Tetrahydrofuran	109-99-9	STEL	100 ppm	US (ACGIH) 2012
Tetrahydrofuran	109-99-9	TWA	50 ppm	US (ACGIH) 2012
Tetrahydrofuran	109-99-9	IDLH	2,000 ppm	NIOSH September 2007
	Remarks: 10% LEL			
Tetrayhydrofuran	109-99-9	TWA	200 ppm 590 mg/m3	US (OSHA) June 23, 2006

Consult local authorities for acceptable exposure limits.

Biological Exposure Indices

Ingredients	CAS-No.	Control Parameters	Biological Specimen	Sampling Time	Concentration
Tetrahydrofuran	109-99-9	Tetrahydrofuran	Urine	End of shift	2 mg/l

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	clear colorless	
Physical State:	liquid at 68 F (20 C), (1,013 hPa (760 mm/Hg))	
Odor:	ether-like	
Solubility:	miscible in water	
Spec Grav./Density:	0.883 g/cm3 at 77 F (25 C)	
Viscosity:	0.516 mm2/s at 77 F (25 C)	0.407 mm2/s at 122 F (50 C)

Boiling Point:	149.27 F (65.15 C)
Freezing/Melting Pt.:	-162.92 F (-108.59 C)
Flash Point:	-6.2F (-21.2 C) Method: (Abel-Pensky method)
Partition Coefficient:	n-octonal/water: log Pow: 0.45 at 77 F (25 C)
Vapor Pressure:	170 hPa (128 mm/Hg) at 68 F (20 C)
Vapor Density:	no data available
pH:	no data available
Molecular weight:	72 g/mol
Auto-Ignition Temp:	~ 419 F (215 C)
Decomp Temp:	not determined

Lower explosion limit: ~ 2 vol%

Upper explosion limit: ~ 11 vol%

Oxidizing properties: no data available

Explosive properties: no data available

10 STABILITY AND REACTIVITY

Chemical Stability:	REACTIVITY: May react with oxygen to form unstable peroxides. Peroxides are themally unstable and shock sensitive. CHEMICAL STABILITY: This product is stable with an appropriate level of Butylated Hydroxy Toluene inhibitor (minimum 200 ppm), but reactive (unstable) without.
Conditions to Avoid:	Heat, sparks, open flame, other iginition sources, and oxidizing conditions.
Materials to Avoid:	Reacts vigorously with strong oxidizers and acids.
Hazardous Decomposition:	HAZARDOUS DECOMPOSITION PRODUCT: No additional information available. THERMAL DECOMPOSITION: Thermal decomposition may produce carbon monoxide and other toxic vapors.
Hazardous Polymerization:	May occur.

11 TOXICOLOGICAL INFORMATION

Product Summary: The below given information is based on the assessment of the product including impurities.

Acute toxicity

Acute oral toxicity: Harmful if swallowed. LD 50 (oral): 1,650 mg/kg, species: rat

Acute inhalation toxicity: Based on acute toxicity values, not classified. LC 50 (Inhl): 14.7 mg/l, Exposure time: 6 hours, Species: rat

Acute dermal toxicity: Based on acute toxicity values, not classified. LD 50 (skin): > 2,000 mg/kg, Species: rat

Skin corrosion/irritation: Based on skin irritation values, not classified.

Serious eye damage/eye irritation: Classified. Causes serious eye damage.

Respiratory or skin sensitization: Skin sensitiziation. Based on skin sensitization values, not classified. Respiratory sensitization, not classified. No study available.

Chronic toxicity

Carcinogenicity: Not classified. Contains a substance that has a positive carcinogenicity study. High life-time exposures of tetrahydrofuran induced liver tumors in female mice by a non-genotoxic mode of action. At exposures that do not produce sustained liver injury, tumor development is of low concern. Increased kidney tumors in male rats occurred by a mode of action not relevant for human health.

Germ cell mutagenicity: Not classified. No adverse effect observed.

Reproductive toxicity

Effects on fertility / Effects on or via lactation: Not classified. No adverse effect observed.

Effects on development: Not classified. No adverse effect observed.

Target organ systemic toxicant - single exposure: Routes of exposure: inhalation. Target organs: Respiratory system, central nervous system. Classified, May cause respiratory irritation, May cause drowsiness or dizziness.

Target organ systemic toxicant - repeated exposure: Based on repeated exposure toxicity values, not classified.

Aspiration hazard: Based on physico-chemical values or lack of human evidence, not classified.

12 ECOLOGICAL INFORMATION

Ecotoxicity Assessment

Acute aquatic toxicity: Based on acute aquatic toxicity values, not classified.

Chronic aquatic toxicity: Not classified, based on conclusive test data.

Toxicity to fish: Low acute toxicity to fish.

Toxicity to daphnia and other aquatic invertebrates: Low acute toxicity to aquatic invertebrates.

Toxicity to algae: Low toxicity to algae.

Toxicity to bacteria: Low toxicity to sewage microbes.

Toxicity of fish (Chronic toxicity): Low chronic toxicity to fish.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity): No data available

Persistence and degradability

Biodegradability: Inherently biodegradable. 36%, testing period: 28 days 61%, testing perior: 52 days

Bioaccumulative potential

Bioaccumulation: This material is not expected to bioaccumulate. Bioconcentration factor (BCF): 3.16, method: (QSAR calculated value)

Mobility in soil

Distribution among environmental compartments: Stability in soil: Low potential for soil absorption expected (based on QSAR calculation of Koc). Stability in soil: No significant hydrolysis is expected. Molecular structure includes no hydrolysable functional groups.

Additional advise

Environmental fate and pathways: No additional information available.

Results of PBT and vPvB assessment: not applicable.

Other adverse effects

Additional ecological information: No additional information available.

13 DISPOSAL CONSIDERATIONS

Contaminated product/soil/water may be U.S. Resource Conservation and Recovery Act (RCRA) / U.S. Occupational Safety and Health Administration (OSHA) hazardous waste due to potentially low flash point. (See 40 U.S. Code of Federal Regulations (CFR) 261 and 29 CFR 1910). Comply with federal, state, or local regulations for disposal.

14 TRANSPORT INFORMATION

UN2056, Tetrahydrofuran, 3, PGII
DOT

UN number: 2056
Description of the goods: Tetrahydrofuran
Class: 3
Packing Group: II
Labels: 3

15 REGULATORY INFORMATION

If identified components of this product are listed under TSCA 12(b) Export Notification rule, they will be listed below. Export notification required.

TSCA 12b
Tetrahydrofuran TSCA section 4

SARA 302/304

Component	TPQ	RQ
Tetrahydrofurn		1,000lbs

SARA 311/312
Based upon available information, this material is classified as the following health and/or physical hazards according to Section 311 & 312:

Immediate (Acute) Health Hazard.
Delayed (Chronic) Health Hazard.
Fire Hazard.

SARA 313
This product contains no known chemicals regulated under SARA 313.

State reporting
This material is not known to contain a chemical substance know to the State of California to cause cancer, reproductive, or developmental toxicity under California Proposition 65. However, Magnum International, Inc. has not tested for the presence of listed chemical substances.

This product contains the following chemicals regulated by New Jersey's Worker and Community Right to Know Act:
109-99-9 Tetrahydrofuran
128-37-0 Butylated Hydroxy Toluene

This product contains the following chemicals regulated by Massachusetts' Right to Know Law:
109-99-9 Tetrahydrofuran
128-37-0 Butylated Hydroxy Toluene

This product contains the following chemicals regulated by Pennsylvania's Right to Know Act:
109-99-9 Tetrahydrofuran
128-37-0 Butylated Hydroxy Toluene

Other international regulations

Global Inventory Status
The ingredients of this product are compliant with the following chemical inventory requirements or exemptions.

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Canada	DSL	Compliant
China	IECSC	Compliant
Europe	REACH	Unknown
Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
United States of America	TSCA	Compliant

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Regulatory CODE Descriptions
-----------------------------------------------------------------
RQ = Reportable Quantity
CERCLA = Superfund clean up substance
HAP = Hazardous Air Pollutants
MASS = MA Massachusetts Hazardous Substances List
OSHAWAC = OSHA Workplace Air Contaminants
PA = PA Right-To-Know List of Hazardous Substances
TOXICRCRA = RCRA Toxic Hazardous Wastes (U-List)
TSCA = Toxic Substances Control Act
TXAIR = TX Air Contaminants with Health Effects Screening Level
TXHWL = TX Hazardous Waste List
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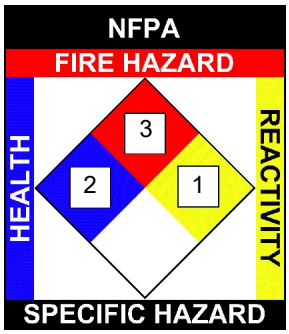
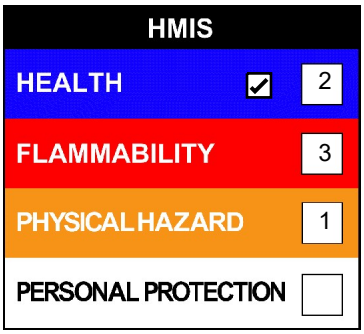
16 OTHER INFORMATION

NFPA: Health = 2, Fire = 3, Reactivity = 1, Specific Hazard = n/a
HMIS III: Health = 2(Chronic), Fire = 3, Physical Hazard = 1





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