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Tetrahydrofuran

| 1 | PRODUCT AND COMPANY IDENTIFICATION |
|----------------------------------|---|
| Product Identifier: Synonyms: | Tetrahydrofuran Tetrahydrofuran Oxide, THF |
| Common Name: | THE |
| SDS Number: | THF |
| Revision Date: | 1/26/2021 |
| Version: | 3 |
| CAS Number: | 109-99-9 |
| Chemical Formula: | C4H8O |
| Supplier Details: | Silver Fern Chemical, Inc. 2226 Queen Anne Ave. North, Suite C Seattle, WA 98109, 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

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.

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COMPOSITION/INFORMATION OF INGREDIENTS

CAS#

Chemical Ingredients

% Chemical Name

109-99-9 >99.0% Tetrahydrofuran

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

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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.

| 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

FIRE FIGHTING MEASURES

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:

ACCIDENTAL RELEASE MEASURES

Personal Precautions:

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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. | Туре | 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% | 5 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

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| 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 PR | OPERTIES | |
|---------------------|--|-----------------------------|--|
| 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 Decomposit | tion: HAZARDOUS DECOMPOSITION PRODUCT: No additional information available. | | |
| | THERMAL DECOMPOSITION: Thermal decomposition may produce carbon monoxide and other toxic vapors. | | |
| Hazardous Polymerizat | ion: 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.

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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.

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.

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TRANSPORT INFORMATION

UN2056, Tetrahydrofuran, 3, PGII DOT

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

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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.

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| 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 |
| | | |

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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OTHER INFORMATION

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



DISCLAIMER OF RESPONSIBILITY

The information on this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, expressed or implied, regarding its correctness. Some information presented and conclusions drawn herein are from sources other than direct test data on the substance itself. The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage, or expense arising out of or in any way connected with handling, storage, use, or disposal of this product. If the product is used as a component in another product, this SDS information may not be applicable.



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