

SAFETY DATA SHEET

This safety data sheet was created pursuant to the requirements of:
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS) and Canadian
Workplace Hazardous Material Information System (WHMIS 2015)

Revision date 01-Jul-2024

Revision Number 1

1. Identification

Product identifier

| | |
|--|--|
| Product Catalog Number: 40-4010-XX | Product Description: Tetrahydrofuran/ 2,6-Lutidine/ Acetic Anhydride |
|--|--|

| | |
|--------------------------------------|----------------------------------|
| Product Code(s) 40-4010-XX | Product Name Cap Mix A |
|--------------------------------------|----------------------------------|

Other means of identification

UN number or ID number UN2924

Synonyms None

Recommended use of the chemical and restrictions on use

Recommended use For research use only

Restrictions on use Not for human diagnostic use

Details of the supplier of the safety data sheet

Manufacturer Address

Glen Research LLC
22825 Davis Drive
Sterling, VA 20164 USA

Emergency telephone number

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2. Hazard(s) identification

Classification

| | |
|--|------------|
| Acute toxicity - Oral | Category 4 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 4 |
| Skin corrosion/irritation | Category 2 |
| Serious eye damage/eye irritation | Category 1 |
| Carcinogenicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 3 |
| Flammable liquids | Category 2 |

Appearance Clear Liquid

Physical state Liquid

Odor Pungent Sweet Ether-like odor

Label elements

Signal word

Danger

Hazard statements

Harmful if swallowed

Harmful if inhaled

Causes skin irritation

Causes serious eye damage

Suspected of causing cancer

May cause respiratory irritation

Highly flammable liquid and vapor



Precautionary Statements - Prevention

Obtain special instructions before use

Do not handle until all safety precautions have been read and understood

Wear protective gloves, protective clothing, eye protection and face protection

Wash face, hands and any exposed skin thoroughly after handling

Do not eat, drink or smoke when using this product

Avoid breathing dust, fume, gas, mist, vapors and spray

Use only outdoors or in a well-ventilated area

Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking

Keep container tightly closed

Ground and bond container and receiving equipment

Use explosion-proof electrical, ventilating, lighting and .? equipment

Use only non-sparking tools

Take action to prevent static discharges

Keep cool

Precautionary Statements - Response

IF exposed or concerned: Get medical advice/attention

Eyes

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing

Immediately call a POISON CENTER or doctor

Skin

If skin irritation occurs: Get medical advice and attention

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

Wash contaminated clothing before reuse

Inhalation

IF INHALED: Remove person to fresh air and keep comfortable for breathing

Ingestion

IF SWALLOWED: Call a POISON CENTER or doctor if you feel unwell

Rinse mouth

Fire

In case of fire: Use CO₂, dry chemical, or foam to extinguish

Precautionary Statements - Storage

Store locked up

Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal

Dispose of contents and container to an approved waste disposal plant

Other information

May be harmful in contact with skin.

Unknown acute toxicity

80 % of the mixture consists of ingredient(s) of unknown acute oral toxicity

90 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

3. Composition/information on ingredients**Substance**

Not applicable.

Mixture

| Chemical name | CAS No. | Weight-% | Hazardous Material Information Review Act registry number (HMIRA registry #) | Date HMIRA filed and date exemption granted (if applicable) |
|------------------|----------|----------|--|---|
| Tetrahydrofuran | 109-99-9 | 74-86 | - | - |
| Acetic Anhydride | 108-24-7 | 7-13 | - | - |
| 2,6-Lutidine | 108-48-5 | 7-13 | - | - |

If CAS number is "proprietary", the specific chemical identity and percentage of composition has been withheld as a trade secret.

4. First-aid measures**Description of first aid measures****General advice**

Show this safety data sheet to the doctor in attendance. Immediate medical attention is required. IF exposed or concerned: Get medical advice/attention.

Inhalation

Remove to fresh air. Get medical attention immediately if symptoms occur. IF exposed or concerned: Get medical advice/attention. If symptoms persist, call a physician. If breathing has stopped, give artificial respiration. Get medical attention immediately.

Eye contact

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Do not rub affected area. Get immediate medical attention. Remove contact lenses, if present and easy to do. Continue rinsing.

Skin contact

Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Get medical attention if irritation develops and persists.

Ingestion

Do NOT induce vomiting. Rinse mouth. Never give anything by mouth to an unconscious person. Get medical attention.

Self-protection of the first aider

Remove all sources of ignition. Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes or clothing. Avoid breathing vapors or mists.

Most important symptoms and effects, both acute and delayed**Symptoms**

Burning sensation. Coughing and/ or wheezing. Difficulty in breathing. May cause redness

and tearing of the eyes. See Section 11 for additional Toxicological Information.

Indication of any immediate medical attention and special treatment needed

Note to physicians Treat symptomatically.

5. Fire-fighting measures

| | |
|---|---|
| Suitable Extinguishing Media | Dry chemical. Carbon dioxide (CO ₂). Water spray. Alcohol resistant foam. |
| Large Fire | CAUTION: Use of water spray when fighting fire may be inefficient. |
| Unsuitable extinguishing media | Do not scatter spilled material with high pressure water streams. |
| Specific hazards arising from the chemical | Risk of ignition. Keep product and empty container away from heat and sources of ignition. In the event of fire, cool tanks with water spray. Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations. |
| Hazardous combustion products | Nitrogen oxides (NO _x). Carbon oxides. |
| Explosion data | |
| Sensitivity to mechanical impact | None. |
| Sensitivity to static discharge | Yes. |
| Special protective equipment and precautions for fire-fighters | Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment. |

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

| | |
|-----------------------------|---|
| Personal precautions | Evacuate personnel to safe areas. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Keep people away from and upwind of spill/leak. ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). Pay attention to flashback. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Avoid breathing vapors or mists. |
| Other information | Ventilate the area. Refer to protective measures listed in Sections 7 and 8. |

Methods and material for containment and cleaning up

| | |
|--------------------------------|---|
| Methods for containment | Stop leak if you can do it without risk. Do not touch or walk through spilled material. A vapor suppressing foam may be used to reduce vapors. Dike far ahead of spill to collect runoff water. Keep out of drains, sewers, ditches and waterways. Absorb with earth, sand or other non-combustible material and transfer to containers for later disposal. |
| Methods for cleaning up | Take precautionary measures against static discharges. Dam up. Soak up with inert absorbent material. Pick up and transfer to properly labeled containers. |

7. Handling and storage

Precautions for safe handling

Advice on safe handling

Use personal protection equipment. Avoid breathing vapors or mists. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use grounding and bonding connection when transferring this material to prevent static discharge, fire or explosion. Use with local exhaust ventilation. Use spark-proof tools and explosion-proof equipment. Keep in an area equipped with sprinklers. Use according to package label instructions. Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. In case of insufficient ventilation, wear suitable respiratory equipment.

Conditions for safe storage, including any incompatibilities**Storage Conditions**

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity). Keep in properly labeled containers. Do not store near combustible materials. Keep in an area equipped with sprinklers. Store in accordance with the particular national regulations. Store in accordance with local regulations. Keep out of the reach of children. Store locked up.

Packaging materials

Glass.

8. Exposure controls/personal protection**Control parameters****Exposure Limits**

| Chemical name | ACGIH TLV | OSHA PEL | NIOSH | |
|------------------------------|---|--|--|--------------------------------------|
| Tetrahydrofuran 109-99-9 | STEL: 100 ppm TWA: 50 ppm S* | TWA: 200 ppm TWA: 590 mg/m ³ (vacated) TWA: 200 ppm (vacated) TWA: 590 mg/m ³ (vacated) STEL: 250 ppm (vacated) STEL: 735 mg/m ³ | IDLH: 2000 ppm TWA: 200 ppm TWA: 590 mg/m ³ STEL: 250 ppm STEL: 735 mg/m ³ | |
| Acetic Anhydride 108-24-7 | STEL: 3 ppm TWA: 1 ppm | TWA: 5 ppm TWA: 20 mg/m ³ (vacated) Ceiling: 5 ppm (vacated) Ceiling: 20 mg/m ³ | IDLH: 200 ppm Ceiling: 5 ppm Ceiling: 20 mg/m ³ | |
| Chemical name | Alberta | British Columbia | Ontario | Quebec |
| Tetrahydrofuran 109-99-9 | TWA: 50 ppm TWA: 147 mg/m ³ STEL: 100 ppm STEL: 295 mg/m ³ Skin | TWA: 50 ppm STEL: 100 ppm Skin | TWA: 50 ppm STEL: 100 ppm Skin | TWA: 50 ppm STEL: 100 ppm Skin |
| Acetic Anhydride 108-24-7 | Ceiling: 5 ppm Ceiling: 21 mg/m ³ | TWA: 1 ppm STEL: 3 ppm | TWA: 1 ppm STEL: 3 ppm | TWA: 1 ppm STEL: 3 ppm |

Biological occupational exposure limits

| Chemical name | ACGIH |
|-----------------------------|---|
| Tetrahydrofuran 109-99-9 | 2 mg/L - urine (Tetrahydrofuran) - end of shift |

Appropriate engineering controls**Engineering controls**

Showers
Eyewash stations
Ventilation systems.

Individual protection measures, such as personal protective equipment

| | |
|--|--|
| Eye/face protection | Tight sealing safety goggles. |
| Hand protection | Contact glove manufacturer for recommendations. Wear suitable gloves. Impervious gloves. |
| Skin and body protection | Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron. Antistatic boots. |
| Respiratory protection | No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required. |
| Environmental exposure controls | Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. |
| General hygiene considerations | Do not eat, drink or smoke when using this product. Contaminated work clothing should not be allowed out of the workplace. Regular cleaning of equipment, work area and clothing is recommended. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. |

9. Physical and chemical properties

Information on basic physical and chemical properties

| | |
|-----------------------|-------------------------------|
| Physical state | Liquid |
| Appearance | Clear Liquid |
| Color | Clear |
| Odor | Pungent Sweet Ether-like odor |
| Odor threshold | No information available |

| <u>Property</u> | <u>Values</u> | <u>Remarks • Method</u> |
|--|--------------------|-------------------------|
| pH | No data available | None known |
| Melting point / freezing point | No data available | None known |
| Initial boiling point and boiling range | No data available | None known |
| Flash point | No data available | None known |
| Evaporation rate | No data available | None known |
| Flammability | No data available | None known |
| Flammability Limit in Air | | None known |
| Upper flammability or explosive limits | No data available | |
| Lower flammability or explosive limits | No data available | |
| Vapor pressure | No data available | None known |
| Relative vapor density | No data available | None known |
| Relative density | 0.90g/mL | None known |
| Water solubility | Completely soluble | None known |
| Solubility in other solvents | No data available | None known |
| Partition coefficient | No data available | None known |
| Autoignition temperature | No data available | None known |
| Decomposition temperature | No data available | None known |
| Kinematic viscosity | No data available | None known |
| Dynamic viscosity | No data available | None known |

Other information

| | |
|-----------------------------|--------------------------|
| Explosive properties | No information available |
| Oxidizing properties | No information available |
| Softening point | No information available |
| Molecular weight | No information available |
| VOC content | No information available |
| Liquid Density | No information available |

Bulk density No information available

10. Stability and reactivity

Reactivity No information available

Chemical stability Stable under normal conditions.

Possibility of hazardous reactions If overheated, the product may release flammable vapors that can form explosive gas mixtures.

Hazardous polymerization Hazardous polymerization does not occur.

Conditions to avoid Heat, flames and sparks. Excessive heat. Extremes of temperature and direct sunlight. Keep from any possible contact with water.

Incompatible materials Strong acids. Strong bases. Strong oxidizing agents. Alcohols. Oxygen. Finely powdered metals.

Hazardous decomposition products Nitrogen oxides (NOx). Carbon oxides.

11. Toxicological information

Information on likely routes of exposure

Product Information

| | |
|---------------------|--|
| Inhalation | Specific test data for the substance or mixture is not available. May cause irritation of respiratory tract. Harmful by inhalation. (based on components). |
| Eye contact | Specific test data for the substance or mixture is not available. Causes serious eye damage. May cause irreversible damage to eyes. |
| Skin contact | Specific test data for the substance or mixture is not available. Causes skin irritation. (based on components). |
| Ingestion | Specific test data for the substance or mixture is not available. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. Harmful if swallowed. (based on components). |

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms Redness. Burning. May cause blindness. May cause redness and tearing of the eyes. Coughing and/ or wheezing.

Acute toxicity

Numerical measures of toxicity

No information available

The following values are calculated based on chapter 3.1 of the GHS document

| | |
|--------------------------------------|----------------|
| ATEmix (oral) | 911.80 mg/kg |
| ATEmix (dermal) | 2,666.70 mg/kg |
| ATEmix (inhalation-gas) | 99,999.00 ppm |
| ATEmix (inhalation-dust/mist) | 4.20 mg/l |
| ATEmix (inhalation-vapor) | 99,999.00 mg/l |

Unknown acute toxicity

80 % of the mixture consists of ingredient(s) of unknown acute oral toxicity

90 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

Component Information

| Chemical name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|------------------------------|----------------------|-------------------------|----------------------------|
| Tetrahydrofuran 109-99-9 | = 1650 mg/kg (Rat) | > 2000 mg/kg (Rat) | > 14.7 mg/L (Rat) 4 h |
| Acetic Anhydride 108-24-7 | = 630 mg/kg (Rat) | = 4000 mg/kg (Rabbit) | 4.2 - 8.5 mg/L (Rat) 4 h |
| 2,6-Lutidine 108-48-5 | = 400 mg/kg (Rat) | - | - |

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

| | |
|--|--|
| Skin corrosion/irritation | Classification based on data available for ingredients. Causes skin irritation. |
| Serious eye damage/eye irritation | Classification based on data available for ingredients. Causes burns. Causes serious eye damage. |
| Respiratory or skin sensitization | No information available. |
| Germ cell mutagenicity | No information available. |
| Carcinogenicity | Contains a known or suspected carcinogen. Classification based on data available for ingredients. Suspected of causing cancer. |

The table below indicates whether each agency has listed any ingredient as a carcinogen.

| Chemical name | ACGIH | IARC | NTP | OSHA |
|-----------------------------|-------|----------|-----|------|
| Tetrahydrofuran 109-99-9 | A3 | Group 2B | - | X |

Legend**ACGIH (American Conference of Governmental Industrial Hygienists)**

A3 - Animal Carcinogen

IARC (International Agency for Research on Cancer)

Group 2B - Possibly Carcinogenic to Humans

Occupational Safety and Health Administration of the US Department of Labor

X - Present

| | |
|---------------------------------|-----------------------------------|
| Reproductive toxicity | No information available. |
| STOT - single exposure | May cause respiratory irritation. |
| STOT - repeated exposure | No information available. |
| Target organ effects | No information available. |
| Aspiration hazard | No information available. |

12. Ecological information**Ecotoxicity**

| Chemical name | Algae/aquatic plants | Fish | Toxicity to microorganisms | Crustacea |
|-----------------------------|----------------------|--|----------------------------|-----------|
| Tetrahydrofuran 109-99-9 | - | LC50: 1970 - 2360mg/L (96h, Pimephales) | - | - |

| | | | | |
|--|--|---|--|--|
| | | promelas) LC50: 2700 - 3600mg/L (96h, Pimephales promelas) | | |
|--|--|---|--|--|

Persistence and degradability Not Likely.

Bioaccumulation Not likely to bioaccumulate.

Bioconcentration factor (BCF) log Pow <= 4

Component Information

| Chemical name | Partition coefficient |
|------------------------------|-----------------------|
| Tetrahydrofuran 109-99-9 | 0.45 |
| Acetic Anhydride 108-24-7 | -0.27 |

Mobility in soil Not expected to adsorb on soil.

Mobility Soluble in water.

Other adverse effects No information available.

13. Disposal considerations

Disposal methods

Waste from residues/unused products Should not be released into the environment. Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

Contaminated packaging Empty containers pose a potential fire and explosion hazard. Do not cut, puncture or weld containers.

California waste information This product contains one or more substances that are listed with the State of California as a hazardous waste.

14. Transport information

DOT

Regulated
UN number or ID number UN2924
Proper shipping name Flammable liquid, corrosive, n.o.s
Transport hazard class(es) Class 3, (8)
Packing group Packing Group II
Reportable quantity - lbs 1000 lbs

IATA

Regulated
UN number or ID number UN2924
UN proper shipping name Flammable liquid, corrosive, n.o.s.
Transport hazard class(es) Class 3, (8)
Packing group Packing Group II

IMDG

Regulated

| | |
|-----------------------------------|-------------------------------------|
| UN number or ID number | UN2924 |
| UN proper shipping name | Flammable liquid, corrosive, n.o.s. |
| Transport hazard class(es) | Class 3, (8) |
| Packing group | Packing Group II |
| EmS-No. | F-E, S-C |

15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Regulations

The Montreal Protocol on Substances that Deplete the Ozone Layer Not applicable

The Stockholm Convention on Persistent Organic Pollutants Not applicable

The Rotterdam Convention Not applicable

International Inventories

TSCA All of the components of this product are listed in the TSCA Inventory or exempt.

DSL/NDSL Listed or exempt.

EINECS/ELINCS Listed or exempt.

ENCS Listed or exempt.

IECSC Listed or exempt.

KECI Listed or exempt.

PICCS Listed or exempt.

AIIC Listed or exempt.

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AIIC - Australian Inventory of Industrial Chemicals

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

| Chemical name | CWA - Reportable Quantities | CWA - Toxic Pollutants | CWA - Priority Pollutants | CWA - Hazardous Substances |
|------------------------------|-----------------------------|------------------------|---------------------------|----------------------------|
| Acetic Anhydride 108-24-7 | 5000 lb | - | - | X |

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).

| Chemical name | Hazardous Substances RQs | Extremely Hazardous Substances RQs | Reportable Quantity (RQ) |
|------------------------------|--------------------------|------------------------------------|--|
| Tetrahydrofuran 109-99-9 | 1000 lb | - | RQ 1000 lb final RQ RQ 454 kg final RQ |
| Acetic Anhydride 108-24-7 | 5000 lb | - | RQ 5000 lb final RQ RQ 2270 kg final RQ |

US State Regulations**California Proposition 65**

This product contains the following Proposition 65 chemicals:

| Chemical name | California Proposition 65 |
|----------------------------|---------------------------|
| Tetrahydrofuran - 109-99-9 | Carcinogen |

U.S. State Right-to-Know Regulations

| Chemical name | New Jersey | Massachusetts | Pennsylvania |
|------------------------------|------------|---------------|--------------|
| Tetrahydrofuran 109-99-9 | X | X | X |
| Acetic Anhydride 108-24-7 | X | X | X |

U.S. EPA Label Information

EPA Pesticide Registration Number Not applicable

16. Other information

| | | | | |
|-------------|--------------------|----------------|--------------------|-----------------------|
| NFPA | Health hazards 3 | Flammability 3 | Instability 0 | Special hazards - |
| HMIS | Health hazards 3 * | Flammability 3 | Physical hazards 0 | Personal protection X |

Key or legend to abbreviations and acronyms used in the safety data sheet

Legend Section 8: Exposure controls/personal protection

| | | | |
|---------|-----------------------------|------|----------------------------------|
| TWA | TWA (time-weighted average) | STEL | STEL (Short Term Exposure Limit) |
| Ceiling | Maximum limit value | Sk* | Skin designation |

Revision date 01-Jul-2024

Revision Note No information available

Disclaimer

The information provided herein is based on sources believed to be reliable as of the issue date of this document, and pertains only to the material designated. Glen Research LLC makes no warranty or representation to its completeness, accuracy or currency. This material is intended for use by persons with the pertinent technical skills and at their discretion and risk. It is responsibility of the user to determine the product's suitability for its intended use, the product's safe use and the product's proper disposal. disposal of hazardous material may be subject to federal, state or local regulations.

End of Safety Data Sheet