

## Section 1 – Chemical Product and Company Identification

MSDS Name: Trimethylphosphine in Tetrahydrofuran

Chemical Family: Organophosphine

Company: Optima Chemicals Group, LLC  
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## Section 2 – Composition, Information on Ingredients

<u>CAS #</u>	<u>EC#</u>	<u>Chemical Name</u>	<u>Wt.%</u>
594-09-2	209-823-1	Trimethylphosphine	20-35
109-99-9	203-726-8	Tetrahydrofuran	65-80

## Section 3 – Hazards Identification

Classifications:

Flammable liquid: Category 2, Skin irritant: Category 2, Eye irritant: Category 2, Specific target organ systemic toxicity-single exposure: Category 3.

NFPA Rating: Health: 2 Flammability: 3 Reactivity: 2 Special: None

Labeling:

Symbols: Flame, Signal word: Danger, Hazard Statements: Highly flammable liquid and vapor, causes skin irritation, causes serious eye irritation, may cause respiratory irritation.

Precautionary Statements:

Keep away from heat/sparks/open flame – No smoking.  
Keep Container tightly closed.  
Ground/bound container and receiving equipment.  
Use explosion-proof electrical, ventilation and lighting equipment.  
Use only non-sparking tools.  
Take precautionary measures against static discharge.  
Wash thoroughly after handling.

Avoid breathing vapors.  
Use only outdoors or in well-ventilated area.

#### **Section 4 – First Aid Measures**

Eyes: Flush eyes with plenty of water for at least 15 minutes, lifting upper and lower lids. Seek medical attention.

Skin: Quickly wipe off as much as possible, then immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing. Thoroughly wash with soap and water, and seek medical attention.

Ingestion: Quickly wipe material from the mouth, and rinse mouth out with plenty of water. Do not induce vomiting. Never give anything by mouth to an unconscious person. Seek medical attention.

Inhalation: Remove from exposure, to fresh air immediately. If not breathing give artificial respiration, and seek medical attention.

Notes to Medical Doctor: Expected to be extremely irritating to eyes, skin, and respiratory system. Consideration should be given to careful endoscopy as stomach or esophageal burns, perforations or strictures may occur. Careful gastric lavage with an endotracheal tube in place should be considered. Observation may be warranted. Treatment is controlled removal of exposure followed by symptomatic and supportive care.

#### **Section 5 – Fire Fighting Measures**

Flammable Limits: Upper: (THF) 11.8% Lower: (THF) 2%

General Hazard: Flammable liquid. Air and oxygen sensitive.

Fire Extinguishing Agents Recommended: Water spray, carbon dioxide, dry chemical powder or alcohol foam.

Hazardous Combustion Products: Carbon dioxide, carbon monoxide, phosphorus oxides.

Special Fire fighting Procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Autoignition temperature: Not available for product. THF: 321 degrees C.

Flashpoint: -30 degrees C (5-10% solution in THF)

Sensitivity to Static Discharge: Yes

Sensitivity to Impact: None

### **Section 6 – Accidental Release Measures**

Remove all sources of ignition. Contain spill with absorbent. Transfer to approved transport container and clean up spillage with an absorbent. Dispose of waste according to local and Federal laws and regulations. Before cleanup measures begin, review the entire MSDS with particular attention to Section 3, and Section 8.

### **Section 7 - Handling and Storage**

Handling: Use in a closed system under argon or nitrogen. Do not get in eyes, on skin or clothing. Do not breathe vapors or mist.

Storage: Store in cool, dry place. Store in tightly closed container. Keep away from sources of ignition, air, acids and oxidizing agents.

### **Section 8 – Exposure Controls, Personal Protection**

Exposure Limits: Tetrahydrofuran: PEL (OSHA) – 200 ppm, TWA (ACGIH) – 50 ppm, STEL/Ceiling (ACGIH) – 100 ppm, IDLH – 2,000 ppm.

Engineering Controls: Use in closed system under argon or nitrogen. If personal contact can occur, use local exhaust ventilation (explosion proof), to keep airborne concentrations below exposure limits.

Eyes and Face: Wear splash goggles with a face shield.

Skin: Wear rubber gloves and rubber protective clothing.

Respiratory: When engineering controls are not adequate, wear a NIOSH/MSHA respirator approved for protection against organic vapors and mists.

Work Hygienic Practices: Quick-drench eyewash and safety shower.

### **Section 9 – Physical and Chemical Properties**

Appearance and Odor: Clear yellow solution, strong stench

Melting Point: -108 .5 degrees C (THF)

Boiling Point: 58 degrees C (20% soln)  
52 degrees C (35% soln)

Flash Point: -30 degrees C (5-10  
% soln in THF)

Vapor Pressure: 200 mm Hg @ 20  
degrees C (20% soln), 250 mm Hg @  
20 degrees C (35% soln)

Vapor Density: 2.49 (THF)

pH: Not available

Specific Gravity: 0.872 g/cc (5-10% soln in THF) Percent Volatile: 100

Water Solubility: Not available

Evaporation Rate: Not available

Flammability: Flammable liquid solvent

Molecular Weight: 76.08

Autoignition Temperature: Not available for  
product, THF: 321 degrees C

Viscosity: Not available

Decomposition Temperature: Not available

Explosive Properties: Not explosive

Oxidizing Properties: Not an oxidizer

### **Section 10 – Stability and Reactivity**

Stability: Stable at room temperature

Incompatibility: Heat, fire, air, and oxidizing chemicals. May react exothermically with halogenated hydrocarbons.

Hazardous Polymerization: Does not polymerize

Hazardous Decomposition Products: Not available

Conditions to Avoid: Heat, sparks, open flame, exposure to air.

### **Section 11 – Toxicological Information**

Eyes: Extremely irritating

Skin: Extremely irritating.

Ingestion: No data available for the product. THF: Oral LD50 = 1650 mg/kg (rat)

Inhalation: No data available for the product. THF: Inhalation LC50 = 21,000 ppm, 3 hr.  
(rat)

Acute Effects from Overexposure: Expected to be extremely irritating to eyes, skin and respiratory system. Strong stench. Inhalation of vapors may cause dizziness, nausea, anesthesia, numbness, motor weakness in fingers and toes, incoordination, and headache. If ingested, may produce a lung aspiration hazard.

Chronic Effects from Overexposure: No data available for the product. Tetrahydrofuran: Repeated or prolonged exposure may cause signs of central nervous system depression and respiratory irritation. One animal study suggests that THF does not cause effects at doses which are not maternally toxic. THF gave negative results in bacterial mutagenicity tests with and without metabolic activation.

Sensitization: No data available for product

Carcinogenicity: Not listed by IARC, OSHA, or EH40. NTP lists THF as a substance that is reasonably anticipated to be a carcinogen, ACGIH lists THF as Category A3, a confirmed animal carcinogen with unknown relevance to humans.

Mutagenicity: No data available for the product. THF: Negative results in bacterial mutagenicity tests with and without metabolic activation.

Reproductive Toxicity: No data available for the product. THF: One animal study suggests that THF does not cause effects at doses which are not maternally toxic.

## Section 12 – Ecological Information

Ecotoxicological Information:

Environmental toxicity testing of the product has not been conducted.

THF: 96 hr. LC50 = 2160 mg/l (fathead minnow) [Handbook of Env. Data on Org. Chem., 4<sup>th</sup> Ed 2001]. 48 hr. LC50 = 2820; 2930 mg/l (orfe) [Handbook of Env. Data on Org. Chem., 4<sup>th</sup> Ed].

Chemical Fate Information:

No data available for the product. Trimethylphosphine reacts with air to form phosphine oxides.

THF: THF is expected to volatilize from both water and soil and leach into groundwater. It will not photodegrade or adsorb to sediment. Limited evidence suggests it may biodegrade. Based on a relatively low Kow (0.47), it is not expected to bioconcentrate.

### **Section 13 – Disposal Considerations**

Dispose of in accordance with federal, state, and local regulations.

### **Section 14 – Transport Information**

DOT Shipping: Flammable liquid, N.O.S. (trimethylphosphine, tetrahydrofuran, solution), 3,UN1993, PG II.

Labels: Flammable.

Custom Tariff No: 2931.00.9160

Marine Pollutant: No

PIH: Not designated Poison Inhalation Hazard by USDOT.

### **Section 15 – Regulatory Information**

United States:

Section 311 Hazard Category (40CFR 370): Reactive, fire hazard, acute health hazard.

Section 313 Reportable Ingredients (40 CFR 372): No reporting requirements.

Section 302 Extremely Hazardous Substances (40 CFR 355): Not listed.

CERCLA Hazardous Substance (40 CFR 302.4): Tetrahydrofuran has a reportable quantity of 1000 pounds.

TSCA Sec 12B Export Notification: Tetrahydrofuran is subject to these requirements.

TSCA Inventory Status (40 CFR 710): This product is for drug or drug intermediate manufacturing purposes only. Trimethylphosphine is not listed on the TSCA inventory. THF is listed.

Canada:

Product Identification No.: 1993

WHMIS: Hazard Classification – Class B, Division 2 (Flammable liquid), Class B, Division 6 (Reactive Flammable Materials), Class D, Division 2B (Poisonous and infectious material), Ingredient Disclosure List: THF is listed.

### **Section 16 – Additional Information**

Creation Date: 10/21/09

This MSDS has been prepared to meet U.S. OSHA Hazard Communication Standard, 29 CFR 1910.1200 and Canada's Workplace Hazardous Materials Information System (WHMIS) requirements.

This information is believed to be accurate and represents the best information currently available to Optima Chemical Group LLC. However, we make no warranty of merchantability, express or implied, with respect to such information and assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.