

Section 1 – Chemical Product and Company Identification

MSDS Name: Lithium Tri-tert-Butoxyaluminum Hydride in Tetrahydrofuran

Chemical Family: Alkali metal hydride

Molecular Formula: $\text{Li AlH}(\text{OC}_4\text{H}_9)_3$

Use of the substance: Industrial Manufacturing

Company: Optima Chemicals Group, LLC
200 Willacoochee Hwy.
Douglas, Georgia 31535
Telephone (912) 384-5101 FAX (912) 384-6330
Emergencies: Telephone (912) 384-5101

Section 2 – Hazards Identification

Hazards:

In contact with water releases flammable gases, which can ignite spontaneously.

Highly flammable liquid and vapor.

Causes severe skin burns and eye damage.

May cause respiratory irritation.

May cause drowsiness or dizziness.

NFPA Rating: Health: 3 Flammability: 4 Reactivity: 2 Special: W

Precautionary Statements:

Keep from any possible contact with water, due to violent reaction and possible flash fire.

Handle under inert gas, protect from moisture.

Wear chemical splash goggles with a face shield, rubber gloves and rubber clothing.

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.

Do not breathe dust or mist.

Wash thoroughly after handling.

Avoid breathing vapors.

Use only outdoors or in well-ventilated area.

In case of fire, use dry chemical for extinction. Do not use water or Carbon Dioxide.

Section 3 – Composition, Information on Ingredients

<u>CAS #</u>	<u>Chemical Name</u>	<u>Wt.%</u>
17476-04-9	Lithium Tri-tert- butoxyaluminum Hydride	23-32
109-99-9	Tetrahydrofuran	58-77
24315-46-6	Lithium Di-tert-butoxyaluminum Hydride	0-5
69537-16-2	Lithium Tetra-tert-butoxyaluminum	0-5
75-65-0	tert-butyl alcohol	0-2

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: This product is corrosive and reacts with water. Formulated product is in a solution: corrosive and reactive properties are still present. Treatment should first involve removing as much of the material as possible as quickly as possible, then flush with large quantities of water. Ingestion presents a singular problem as emesis may produce esophageal damage and/or aspiration damage. Consideration may be given to gastric lavage with a large diameter tube for removal of material and then dilution with large amounts of water. Esophagoscopy may be of assistance in this procedure and to assess extent of damage. Treatment is otherwise symptomatic and supportive.

Section 5 – Fire Fighting Measures

Flammable Limits: Upper: Not available Lower: Not available

General Hazard: Flammable liquid. Reacts violently with water to give off flammable fumes and corrosive dust. Do not breathe smoke, gases or vapors generated.

Fire Extinguishing Agents Recommended: Do not use water or CO₂. Use dry chemical.

Hazardous Combustion Products: Lithium hydroxide, carbon dioxide, carbon monoxide.

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

Autoignition temperature: Not applicable.

Flashpoint: -17 degrees C (THF)

Sensitivity to Static Discharge: Yes

Sensitivity to Impact: None

Section 6 – Accidental Release Measures

Remove all sources of ignition. Do not use water in the initial phases of clean up. Hydrogen gas is produced on contact with moisture or humidity. Take precautions to prevent explosion of hydrogen gas. 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, water, air, acids and oxidizing agents.

Section 8 – Exposure Controls, Personal Protection

Exposure Limits (tetrahydrofuran): PEL (OSHA) – 200 ppm, TWA (ACGIH) – 200 ppm, STEL/Ceiling (ACGIH) – 250 ppm.

(Tert-butyl alcohol): PEL (OSHA) – 100 ppm, TWA (ACGIH) – 100 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: Colorless to gray, solvent odor of tetrahydrofuran.

Water Solubility: Exothermic reaction to form basic Lithium Hydroxide and Hydrogen Gas.

Melting Point: Not available

Boiling Point: 66 degrees C (THF)

Flash Point: -17 degrees C (THF)

Vapor Pressure: Not available

Vapor Density: (Air = 1): 2

pH: Not applicable

Specific Gravity: 0.904 g/cc

Percent Volatile: 58-77%

Evaporation Rate: Not available

Oxidizing Properties: Not an oxidizer

Flammable Limits: Not available

Molecular Weight: 254.26

Autoignition Temperature: Not available

Viscosity: Not available

Decomposition Temperature: Not available

Explosive Properties: Not applicable

Section 10 – Stability and Reactivity

Stability: Stable under normal handling conditions at room temperature.

Incompatibility: Heat, fire, air, water, acids and oxidizing chemicals

Hazardous Polymerization: Does not polymerize

Hazardous Decomposition Products: Lithium hydroxide, aluminum oxides, liberates flammable/explosive hydrogen gas.

Conditions to Avoid: Water, heat, sparks, open flame, air.

Section 11 – Toxicological Information

Eyes: Lithium Tri-tert-Butoxyaluminum Hydride is corrosive.

Skin: Lithium Tri-tert-Butoxyaluminum Hydride is corrosive.

Ingestion: No data available for the product.

THF: Oral LD50 = 1650 mg/kg (rat)

t-butanol: LD50=27.43 mg/kg (rat)

Inhalation: No data available for the product.

THF:Inhalation LC50 = 21,000 ppm, 3 hr. (rat)

t-butanol: LD50>10000ppm (rat)

Acute Effects from Overexposure: No data available for the product. This product is corrosive to skin, eyes (may cause blindness), mucous membranes, and upper respiratory tract. Inhalation of vapors may cause dizziness, nausea, anesthesia, numbness, burning sensation and motor weakness in fingers and toes, incoordination, and headache.

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.

Sensitization: No

Carcinogenicity: Not listed by IARC, OSHA, or EH40. THF is listed as a substance that is reasonably anticipated to be a carcinogen by the NTP. ACGIH lists THF as Category 3, 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., 4th Ed 2001]. 24 hr. EC50 = 5.93 g/l (Daphnia magna) [AQUIRE 2003].

Chemical Fate Information:

No data available for the product. Lithium Tri-tert-Butoxyaluminum Hydride reacts violently with water to form lithium hydroxide, hydrogen, and aluminum 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.

T-butanol: expected to readily volatilize from both water and soil. Not expected to adsorb to sediment or bioconcentrate in aquatic organisms. May be very mobile in soil and may leach to groundwater.

Section 13 – Disposal Considerations

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

Section 14 – Transport Information

DOT Shipping: Organometallic substance, liquid, water-reactive, flammable, (Lithium Tri-tert-Butoxyaluminum Hydride in tetrahydrofuran), N.O.S., 4.3 Dangerous when wet (3, flammable liquid), UN3399, PG 1.

Labels: Dangerous when wet, 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): T-butanol is subject to reporting..

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): Listed

Canada:

Product Identification No.: 1411

WHMIS: Hazard Classification – Class B, Division 2 (Flammable liquid), Class B, Division 6 (Reactive Flammable Materials/Flammable gas on contact with water), Class E, (Corrosive), Ingredient Disclosure List: Tetrahydrofuran and T-butanol are listed (1%).

Section 16 – Additional Information

Creation Date: 06/18/10

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.