Section 1 – Chemical Product and Company Identification

MSDS Name: Lithium Diisopropylamide in tetrahydrofuran-heptane

Chemical Family: Organometallic Amide

Molecular Formula: $Lin[CH(CH_3)_2]_2$

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:

Highly flammable liquid, Corrosive - Causes severe skin burns, eye damage, and is extremely destructive to tissue of the mucous membranes and upper respiratory tract. 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.

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

Section 3 – Composition, Information on Ingredients

CAS #	Chemical Name	Wt.%
4111-54-00	Lithium Diisopropylamide	20-30
108-18-9	Diisopropylamine	<4
109-99-9	Tetrahydrofuran	20-30
100-41-4	Ethylbenzene	10-15
64742-49-0	Heptanes	25-30
n/a	Organo-magnesium (stabilizer)	0-0.9
106-97-8	n-butane	<3
100-42-5	Styrene	<1

Section 4 – First Aid Measures

Eyes: Flush eyes with plenty of water for at least 15 minutes, lifting upper and lower lids. See a medical doctor or ophthalmologist immediately.

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 and/or shoes. 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 breathing discomfort occurs and persists, seek medical attention. If not breathing give artificial respiration, and seek medical attention.

Notes to Medical Doctor: This product has a high ph and is corrosive to eyes, skin and mucous membranes. Due to the potential for severe esophageal injuryand the low oral toxicity, emesis should be avoided. Careful gastric lavage with an endotracheal tube in place should be considered. Observations for effects on the central and peripheral nervious systems, as well as lung function. Treatment is controlled removal of exposure with symptomatic and supportive care.

Section 5 – Fire Fighting Measures

Flammable Limits:	Upper	Lower
Tetrahydofuran	11.8	2
Heptane	6.7	1.05
Ethylbenzene	6.7	0.8

General Hazard: Flammable liquid. Reacts violently with water to give off flammable fumes and corrosive dust.

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

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

Special Fire fighting Procedures: Wear self-contained breathing apparatus and protective clothing(approved for firefighting) to protect against heat, products of combustion and oxygen deficiency.. Do not breathe smoke, gases or vapors generated.

Autoignition temperature: Ethylbenzene-432ºC and THF-321ºC

Flashpoint: 2ºC
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. Contain spill with absorbent. Transfer to approved transport container and clean up spillage with an Absorbent. Dispose of waste according to local, state 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: PEL (OSHA), ST/Ce(OSHA),TWA (ACGIH), ST/Ce (ACGIH),IDLH

Tetrahydrofuran	200ppm		200ppm	250ppm
Diisopropylamine	5ppm		5ppm	
Ethylbenzene	100ppm		100ppm	125ppm
n-heptane	500ppm		500ppm	400ppm
methylcyclohexane	500ppm		400ppm	
Styrene	100ppm	200ppm	20ppm	40ppm
Butane			100ppm	

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 chemical 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: liquid, clear, yellowish to reddish; Pungent.

Melting Point: 0ºC (<32ºF) Percent Volatile: 70-80

Vapor Density: Air=1 (2) 3.66 (eb), 2.49 (THF) Flash Point: -20ºC (-8ºF))

pH: Reacts with water to form ph 13-14

Boiling Point: Appr 60ºC to 136ºC; 136ºC (ethylbenzene); 66ºC (THF); 98ºC (heptane)

Vapor Pressure: 7 mm Hg at 20ºC (ethylbenzene) (THF), 31mm Hg @20ºC (tert-butyl alcohol)

Evaporation Rate: 8 THF , 0.84 ethylbenzene Specific Gravity: 0.6 to 0.9 g/ml

Water Solubility: Exothermic reaction to form basic lithium, magnesium hydroxide and diisopropylamine.

Autoignition Temperature: 432ºC ethylbenzene, 321ºC THF

Explosive Properties: Not explosive COEFF> o/w: 3.15 ethylbenzene; 0.46 THF

Oxidizing Properties: Not an oxidizer Molecular Weight: 107.13

Section 10 – Stability and Reactivity

Stability: Stable at room temperature

Hazardous Polymerization: Does not polymerize

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

Hazardous Decomposition Products: Lithium oxide, hydroxide, hydride, hydride, amines

Conditions to Avoid: Water, heat and temperatures above 40ºC (104ºF)

Section 11 – Toxicological Information

Eyes: No data available for the product. Corrosive

Skin: Corrosion, PG II, Corrositex in vitro skin corrosion

Ingestion: No data available for the product. Lithium Diisopropylamine: corrosive, Diisopropylamine: Oral LD_{50} = 770 mg/kg (rat), Ethylbenzene: oral LD_{50}=3500 mg/kg (rat), THF: LD_{50}=1650mg/kg, Styrene: Oral LD_{50} = 2650 mg/kg (rat)

Inhalation: No data available for the product, Lithium Diisopropylamine: corrosive,
THF:Inhalation : LC50 = 21000ppm, 3hr, (rat)
Diisopropylamine : LC50 = 4800 mg/m3/2H (rat)
Styrene inhalation: LC_{50} = 11800mg/m3/4H (rat)
Ethylbenzene: LC50 = 4000ppm,4hr, (rat)
n-heptane: LC_{50} = 103gm/m3/4H (rat)
Butane: LC_{50} = 658gm/m3/4H (rat)

Acute Effects: No data available for the product. Reacts with water to produce flammable gases and corrosive dusts, Extremely reactive and corrosive to skin, eyes (may cause blindness), mucous membranes and upper respiratory tract. THF,Inhalation of vapors may cause dizziness, nausea, anesthesia, numbness, burning sensation and motor weakness in fingers and toes, incoordination, and headache. Low viscosity material if swallowed may cause damage to lungs.

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. Ethylbenzene: cause developemental toxicity at levels that are not toxic to mothers,

Sensitization: No

Carcinogenicity: No listed by IARC; Ethylbenzene listed in group 2B, NTP: THF is listed as reasonable, OSHA; ethylbenzene and styrene, ACGIH; ethylbenzene listed in A3 and styrene listed in A4, EH40; not listed.

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]. 48 hr LC50 = 2820; 2930m g/l (orfe)) [Handbook of Env. Data on Org. Chem., 4th Ed],

Chemical Fate Information:

No data available for the product. Lithium t-butoxide reacts violently with water to form lithium hydroxide and t-butanol.

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. n-heptane- is expected to readily volatize with both water and soil If released to water the product will float. The product is insoluable in water. If released in soil it will evaporate at a rapid rate. Poorly absorbed into soil and sediment. It is readily biodegradable. Photochemical degradation in the air will proceed at a moderate rate. BOD5=55% thOD. Heptane is not expected to bioaccumulate. Lithium Diisopropylamide; reacts vigorously with water, releasing diisopropylamone and lithium hydroxide. All organic ingredients of this product are expected to volatize from both soil and water. All have a tendency to biodegrade but all are not expected to bioaccumulate.

Section 13 – Disposal Considerations

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

Section 14 – Transport Information

DOT Shipping: flammable liquid, corrosive, N.O.S. (lithium diisopropylamide in tetrahydrofuran/heptane), 3,flammable liquid,(8, corrosive) UN2924, PG II.

Labels: Flammable, corrosive.

Custom Tariff No: 2942.00.0000

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, immediate (acute); health hazard. Delayed chronic health hazard.

Section 313 Reportable Ingredients (40 CFR 372): Ethylbenzene and styrene are reportable..

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

CERCLA Hazardous Substance (40 CFR 302.4): Tetrahydrofuran . ethylbenzene, styrene all have a reportable quantity of 1000 pounds.

TSCA Sec 12B Export Notification: Tetrahydrofuran and heptane are subject to these requirements.

TSCA Inventory Status (40 CFR 710): Listed

Canada:

Product Identification No.: 2924

WHMIS: Hazard Classification – Class B, Division 2 (Flammable liquid), Class B, Division 6 (Reactive Flammable Materials/Flammable gas on contact with water), Class D, division 2B (toxic material with chronic effects), Class E, (Corrosive), Ingredient Disclosure List: Tetrahydrofuran, diisopropylamine, heptanes, ethylbenzene, styrene and butane.

Section 16 – Additional Information

Creation Date: 02/05/2010

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.