

MATERIAL SAFETY DATA SHEET



SECTION 1 - Chemical Product and Company Identification

OmniCel Batteries
300 Schell Lane, Suite 301
Phoenixville, PA 19460
U.S.A.

Emergency Contact:
CHEMTREC
Tel: 800-424-9300

PRODUCT NAME: Lithium Thionyl Chloride Battery
CHEMICAL REACTION: $4\text{Li} + 2\text{SOCl}_2 \longrightarrow 4\text{LiCl} + \text{S} + \text{SO}_2$

SECTION 2 - Composition, Information on Ingredients

NAME	OSHA PEL	ACGIH TLV
Lithium (Li)	N/A	Not established
Thionyl Chloride	1.0 ppm (4.9 mg/m ³)	1.0 ppm (4.9 mg/m ³)
Aluminum Chloride (AlCl ₃)	2 mg/m ³	2 mg/m ³
Lithium Chloride	Not established	Not established

SECTION 3 - Hazards Identification

****DANGER**** INTERNAL CONTENTS ARE EXTREMELY HAZARDOUS. LEAKING FLUID IS CORROSIVE. BATTERY MAY BE EXPLOSIVE AT HIGHER TEMPERATURES.

Do not expose to temperatures above temperature rating of battery due to leak hazard.

If cell or battery leaks or vents

- **Primary Routes of Entry:** Inhalation
- **Carcinogeny:** Not listed by NTP, IARC, or regulated by OSHA.
- **Health Hazards:**
 - Acute** – Vapors are very irritating to skin, eye, and mucous membranes. Inhalation of thionyl chloride may result in pulmonary edema.
 - Chronic** – Overexposure can cause symptoms of non-fibrotic lung injury.
- **Signs and Symptoms of Exposure:** Eye and mucous membrane irritation.
- **Medical Conditions Generally Aggravated by Exposure:** Asthma, other respiratory disorders, skin allergies, and eczema.

SECTION 4 - First Aid Measures

Eye Contact: Flush with running water for at least 15 minutes. Hold eyelids apart. Seek immediate medical attention. Contact results in acidic burns.

Skin Contact: Rinse with large amounts of running water. Avoid hot water and rubbing skin. If burns develop, seek medical attention. Contact results in acidic burns.

Inhalation: Remove to fresh air. If breathing is difficult, administer oxygen. If not breathing, give artificial respiration. May result in pulmonary edema.

Ingestion: Drink copious amounts of water (or milk if available). Do not induce vomiting. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. Immediately seek medical attention

■ SECTION 5 - Fire Fighting Procedures

Flash Point: N/A

Auto-Ignition Temp: N/A

Flammable Limits: N/A

Danger - Do not use water

Extinguisher Media: Lith-X powder, Class D fire extinguisher, Dry Lithium Chloride, Graphite Powder, Pyrene G-1.

Special Fire Fighting Procedures: Cover with Lith-X powder, Class D fire extinguisher, dry lithium chloride, or graphite powder. DO NOT USE WATER, moist sand, CO₂, Class ABC, or soda ash extinguisher. Wear protective breathing apparatus; a positive pressure Self Contained Breathing Apparatus (SCBA), or Air Purifying Respirator (APR).

Unusual Fire and Explosion Hazards: Do not short circuit, recharge, over discharge (discharge below 0.0 Volts), puncture, crush or expose to temperatures above 150°C. Cell may leak, vent, or explode. If a bright white flame is present, lithium content is exposed and on fire; used a Class D fire extinguisher. Do not use water.

■ SECTION 6 - Accidental Release Measures

Accidental Releases: Do not breathe vapors or touch liquid with bare hands (see section 4).

Waste Disposal Methods: Evacuate area. If possible, a trained person should attempt to stop or contain the leak by neutralizing spill with soda lime or baking soda. A NIOSH Approved Acid Gas Filter Mask or Self-Contained Breathing Apparatus should be worn. Seal leaking battery and soda lime or baking soda in a plastic bag and dispose of as hazardous waste.

Other: Follow North American Emergency Response Guide (NAERG) #138 for cells involved in an accident, cells that have vented, or have exploded.

■ SECTION 7 - Handling and Storage

Storage: Cells should be stored at room temperature, approx. 21°C (70°F)

Precautions: Do not short circuit or expose to temperatures above 150°C. Do not recharge, over discharge, puncture or crush.

Other Conditions: Do not store cells in high humidity environments for long periods of time.

■ SECTION 8 - Exposure Controls / Personal Protection

When handling internal components:

- **Respiratory Protection:** NIOSH Approved Acid Gas Filter Mask, or Self-Contained Breathing Apparatus.
 - **Protective Gloves:** Nit rile or PVC, Gloves should be 15 ml (0.015 in.), or thicker.
 - **Eye Protection:** Chemical Worker Safety Glasses or face shield.
 - **Ventilation To Be Used:** Negative Pressure chemical fume hood.
 - **Other Protective Clothing & Equipment:** Chemical Laboratory Safety Glasses, Protective Apron, Acid Resistant Protective Clothing, and face shield.
 - **Hygienic Work Practices:** Use good chemical hygiene practice. Do not eat or drink when handling contents. Avoid unnecessary contact.
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■ SECTION 9 - Physical / Chemical Characteristics

Boiling Point: N/A

Vapor Pressure: Thionyl Chloride: 92mm 20°C

Vapor Density: Thionyl Chloride: 4.1

Solubility in Water: Thionyl Chloride: Decomposes violently on contact with water

Specific Gravity: Thionyl Chloride: 1.63

Melting Point: N/A

Evaporation Rate: N/A

Water Reactive: Thionyl Chloride hydrolyzes to form SO₂ and HCl gasses and strongly acidic wastewater.

Appearance and Odor: Thionyl Chloride-Colorless to pale yellow; sharp, pungent odor.

■ SECTION 10 - Stability and Reactivity

Stability: Stable

Conditions to Avoid: Temperatures in excess of 150°C. High humidity for extended periods.

Incompatibility: N/A

Hazardous Decomposition Products: Sulfur Dioxide (g), Hydrogen Chloride (g).

Hazardous Polymerization: Will not occur

■ SECTION 11 - Toxicological Information

Acute Toxicity:

Thionyl Chloride

LC₅₀ (Inhalation): 1274 ppm (rat 1-hr)

LD₅₀: N/A

Eye Effects: Corrosive

Skin Effects: Corrosive

Aluminum Chloride

LC₅₀(Oral Rat): 3450 mg/kg

Fetotoxicity: Has adverse effects on growth and behavior.

Gallium (□) Chloride

LC₅₀: N/A

Eye Effects: N/A

Other Effects: N/A

■ SECTION 12 - Ecological Information

Aquatic Toxicity: Do not let internal components enter marine environments. Avoid releases into waterways, wastewater or groundwater.

SECTION 13 - Disposal Considerations

Proper Shipping Name: Waste Lithium Batteries

UN Number: 3090

Hazard Classification: Class 9 (Misc.)

Packing Group: II

Labels Required: MISCELLANEOUS HAZARDOUS WASTE

Waste Disposal Code: D003

Other: All lithium thionyl chloride batteries should be disposed of by a certified hazardous waste disposal facility.

SECTION 14 - Transport Information

Lithium metal (primary) cells and batteries are classified and regulated as Class 9 dangerous goods (also known as "hazardous materials" in the United States) by the International Civil Aviation Organization (ICAO), International Air Transport Association (IATA), International Maritime Organization (IMO) and U.S. Department of Transportation (DOT). These organizations and agencies publish regulations that contain detailed packaging, marking, labeling, documentation, and training requirements that must be followed when offering (shipping) cells and batteries for transportation. The regulations are based on the UN Recommendations on the Transport of Dangerous Goods Model Regulations and the UN Manual of Tests and Criteria. The regulations also have specific training requirements for employees who prepare lithium batteries or lithium batteries packed with or contained in equipment. *Failure to comply with these regulations can result in substantial civil or criminal penalties.*

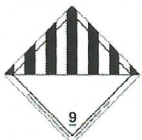
*"Small" cells and batteries may not be subject to certain provisions of the regulations (e.g., Class 9 labeling and UN specification packaging) if they meet specific requirements. (See regulations referenced below for more information.)

Cell and Battery UN Testing Requirements: The hazardous materials regulations require that each cell and battery design be subject to tests contained in Section 38.3 of the UN Manual of Tests and Criteria. **Batteries or battery packs constructed from UN tested cells must be subjected to tests contained in the UN Manual of Tests and Criteria.**

Regulations:

- **US DOT** - 49 CFR 173.185, See also 49 CFR 172.102 Special Provisions 29, 188, 189, 190, A54 and A55, A100, A101, A103, and A104
- **IATA/ICAO** - Packing Instructions 968, 969, and 970; Special Provisions A45, A88, and A99, A154, A164
- **IMDG Code** - Packing Instruction 968, Special Provisions 188, 230, 310, and 957

CLASS 9 LABEL *



*When required

PROPER SHIPPING NAMES:

Lithium batteries

Lithium batteries contained
in equipment

Lithium batteries packed
with equipment

UN NUMBERS:

UN3090

UN3091

UN3091

SECTION 15 - Regulatory Information

OSHA Status: The internal component (thionyl chloride) is hazardous under the criteria of the Federal OSHA Hazard Communication Standard 29 CFR 1920.1200. Because all cells and batteries are defined as "articles", they are exempt from the requirements of the Hazard Communications Standard.

National Fire Protection Association (NFPA) Rating: Lithium batteries are currently not included in the NFPA material list.

NFPA Rating for Lithium Metal:

Lithium metal is an internal component, enclosed by a hermetically sealed metallic can, which under normal application is not exposed.

