

Date: Jan. 2009

Material Safety Data Sheet

(Originated from OSHA Hazard Communication Standard, 29CFR1910.1200)

1. Product Identification

Product Name: Lithium Thionyl Chloride Battery
(Li-SOCl₂, Non-Rechargeable 3.6V)

Chemical Reaction: $4\text{Li} + 2\text{SOCl}_2 \rightarrow 4\text{LiCl} + \text{S} + \text{SO}_2$

Models (IEC Standard): XL-050F(ER14252), XLP-050F(ER14252), XL-050H(ER14252), XL-050FC(ER14252), XL-055F(ER14335), XLP-055F(ER14335), XL-060F(ER14505), XLP-060F(ER14505), XL-060H(ER14505), XL-100F(ER17500), XL-140F(ER26500), XL-145F(ER26500), XL-200F(ER32L615), XL-205F(ER32L615), XL-210F(ER33L65)

2. Composition/Information on Ingredients

NAME	CAS No	OSHA/NIOSH/ ACGIH TLV
Lithium Metal (Li)	7439-93-2	N/A
Thionyl Chloride(SOCl ₂)	7719-09-7	4.9 mg/m ³
Aluminum Chloride (AlCl ₃)	7446-70-0	2 mg/m ³
Lithium Chloride (LiCl)	7447-41-8	Not established
Carbon (C)	1333-86-4	3.5 mg/m ³

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3. Health Hazard Standard

Inhalation	No	Ingestion	No
Health Hazard	No	Skin	No

Signs or Symptoms of Exposure: Unless the electrolyte is exposure or rupture, there are no symptoms. When exposed to internal contents, corrosive fumes will be very irritating to skin, eyes, and mucous membranes. Continuous exposure can cause sign of non-fibrotic lung injury and membrane irritation.

Medical Conditions Generally Aggravated by Exposure: There may occur eczema, skin allergies, lung injuries, asthma, and other respiratory disorders when exposed.

4. Emergency First Aid Procedures

Eye Contact: Flush with Running Water for at Least 15 Minutes. Hold eyelids apart. Seek immediate treatment.

Skin Contact: Rinse with plenty of running water. If burns develop, seek medical treatment.

Inhalation: Remove to fresh air. If necessary, administer oxygen and seek medical treatment.

Ingestion: Find immediate medical treatment.

5. Fire and Explosion Hazard Standard

Flash Point	N/A	Flammable Limits	N/A
Auto ignition	N/A	ExtinguisherMedia	Lith-X or other metal (Class D) fire extinguishers

Fire and Explosion Condition: Continuously exposed to above 100°C (212°F) caused by abnormal environmental condition. Drop contents of lithium metal to water.

Special Fire Fighting Procedures: Do not use water, sand, carbon dioxide, or soda ash extinguisher. Wear protective breathing apparatus and protective garments.

Unusual Fire and Explosion Hazards: Do not short circuit, recharge, over-discharge, puncture, incinerate, crush or expose to temperature above the temperature rate of the battery.

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6. Accidental Release Measures

None under normal use conditions. If contents leak, observe the following instructions

Protection for person Use full protective equipment to avoid breathing vapors or touching liquid.
Removing procedure Put the leaked battery into large container filled with water. Rinse the leaked liquid with water.

Area Evacuate the area except for operators. After above procedures, ventilate the contaminated area.

7. Precautions For Safe Handling and Use

Working Steps when Material is Spilled or Released: Do not breathe vapors nor touch liquid with bare hands.

Waste Disposal Method: Neutralize spill with soda lime, seal leaking battery and soda lime in plastic bag and dispose of as hazardous waste.

Precautions in Handling and Storage: Do not short circuit or expose to temperature rates of the battery. Do not recharge, over-discharge, puncture, or crush.

Other Precaution and/or Special Hazards: Do not store batteries in high humidity and environment for long periods because such condition can cause higher self-discharge.

8. Control Standard

Respiratory Protection: As any fire situation is happened, use self-contained breathing apparatus if a cell vent or fire occurs.

Eye Protection: Safety glass are recommended

Protective Gloves: In case of leakage, wear gloves.

Other Protective Clothing: In the event of leakage, wear chemical apron.

Ventilation:

Local Exhaust: Yes

Medical: N/A

Special: N/A

Other: N/A

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9. Physical Characteristics

Melting Point	N/A	Boiling point	N/A
Vapor Pressure	N/A	Specific Gravity	N/A
Vapor Density	N/A	Solubility in Water	N/A
Odor	If leaked, sharp, pungent odor		
Appearance	Cylindrical type		
Water reaction	When open by force, the ingredients hydrolyzed to form SO ₂ and HCl upon contact with water.		

10. Reactivity Standard

Stability: Stable (hermetically sealed type, used in recommended conditions)

Condition to Avoid: Give too much force, drop, crush & disassemble, short-circuit, recharge, fire & heat above 100 °C (212 °F), incinerate and etc.

Incompatibility: Do not expose internal contents to water

Hazardous Decomposition Products: SO₂, HCl, LiOH and H₂

Hazardous Polymerization: Will not occur.

11. Toxicological Information

N/A

12. Ecological Information

N/A

13. Disposal

Different to the policy of each country. Normally, it is not allowed to throw away.

- Proper Shipping Name: Used Lithium Batteries
- UN Number: UN3090
- Hazard Classification: Class 9(Miscellaneous)
- Packing Group : II
- Labels Required: Miscellaneous Hazardous Waste
- Disposal Code: D003

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- Other: All lithium thionyl chloride batteries should be disposed of by a proper disposal facility.

14. Transportation

Regulation

IATA / ICAO

(International Air Transport Association / International Civil Aviation Organization)

US DOT (US Federal Department of Transportation)

ADR / RID (European Road and Railroad Transportation)

- 1. UN Number: UN3090 / UN3091**
- 2. Shipping Name: "Lithium Metal Batteries"**
- 3. Packing instruction: 968**

- Small size: 1/2AA, 2/3AA, AA, A and 1/10D

Hazard Classification: No Class 9 (Miscellaneous)

Packing Group:

Part I : small sizes → Non-Dangerous goods packing based on special provision A45

Passenger cargo: Max. 2.5Kg per carton

Cargo aircraft only: Max. 35Kg per carton

Special Provisions: 188, 230, 310, 636 of ADR/RID 2003 or A45, A48, A88, A99 of IATA Dangerous Goods Regulations 2009 50th (UN No. 3090, 3091)

- Big size(C and D)

Hazard Classification: Class 9 (Miscellaneous)

Packing Group:

Part II : big sizes → Dangerous goods packing.

Package: 4G box(Group II) with special documents.

Passenger cargo: Max. 2.5Kg per carton

Cargo aircraft only: Max. 35Kg per carton

- Each shipment must be accompanied with a mark and a document indicating that the package contains lithium batteries and that special procedures should be followed in the event a package is damaged.

Transportation of Lithium Batteries

Basically, regarded as dangerous goods based on above regulations when lithium batteries are delivered via air. However, Lithium metal cells and batteries offered for transport are not subject to other provisions of these Regulations if they meet the following:

- 1) For a lithium metal cell, the lithium content is not more than 1g
- 2) For a lithium metal or lithium alloy battery, the aggregate lithium content is not more than 2g
- 3) Each cell or battery is of a type proved to the requirements of each test in the UN

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Manual of Tests and Criteria, Part III, subjection 38-3;

4) Cells and batteries are separated so as to prevent short circuits and are packed in strong packages, except when installed in equipment.

- *XenoEnergy lithium metal batteries, 1/2AA, 2/3AA, AA, A and 1/10D meet above Special Provisions No. 1, 2, 3 and 4.*
- *XenoEnergy lithium metal batteries, C and D do not meet above Special Provisions No. 1 and 2. Thus, special package is necessary based on packaging group II.*
- *XenoEnergy lithium metal batteries meet the requirement of each test in the UN Manual Tests and Criteria (8 tests), Part III, subjection 38-3 through the interim tests including Altitude, Temperature, Vibration, Shock, Internal Short Circuit, Impact, Overdischarge and Forced discharge.*
- *For shipment by sea, all of batteries are not applied for special packing based on IMDG Code 2008. Thus, all of batteries can be shipped by sea without limitation.*

15. Regulatory Information

N/A

16. Other Information

For further information, please contact a XenoEnergy Co., Ltd.

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