Date: January 2011

# Material Safety Data Sheet

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

## 1. Product Identification

**Product Name:** Lithium Thionyl Chloride Battery
($Li\text{-}SOCl_2$, Non-Rechargeable 3.6V)

**Chemical Reaction:** $4Li + 2SOCl_2 \rightarrow 4LiCl + S + SO_2$

**Models (IEC Standard)**

**-Small Size Battery** XL-050F(ER14252), XLP-050F(ER14252), XL-055F(ER14335), XLP-055F(ER14335), XL-060F(ER14505), XLP-060F(ER14505), XL-100F(ER17500), XL-210F(ER33L65)

**-Big Size Battery** XL-140F(ER26500), XL-145F(ER26500), XL-200F(ER32L615), XL-205F(ER32L615)

## 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$^3$ |

## 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℃ (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.

## 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 or plastic bag filled with send or water including $NaCl_2$(Salt) or CaCO3(Limestone) or CaO(Quicklime).
Rinse the leaked liquid with water afterwards.
Area Evacuate the area except for operators. After above procedures, ventilate the contaminated area.

## 7. Precautions For Safe Handling and Storage

**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 |

## 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℃ (212°F), incinerate and etc.

**Incompatibility:** Do not expose internal contents to water

**Hazardous Decomposition Products:** $SO_2$, HCl, LiOH and $H_2$

**Hazardous Polymerization:** Will not occur.

## 11. Toxicological Information

N/A

## 12. Ecological Information

The batteries do not contain Mercury, Cadmium or other heavy metals.

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

## 14. Transportation

**Class 9**

**UN 3090:** **LITHIUM METAL BATTERIES**
**UN 3091:** **LITHIUM METAL BATTERIES CONTAINED IN EQUIPMENT, or LITHIUM METAL BATTERIES PACKED WITH EQUIPMENT**

**Packing group:** **II**

**Special provisions and packing instructions:**

**ADR, RID:** **188, 230, 310, 636, P903, P903a, P903b**
**IATA:** **A88, A99, A154, A164, P968, P969, P970**
**IMDG-Code:** **188, 230, 310, P903**
**EmS: F-A, S-I**
**Storage and segregation: Category A**

**Exemptions**

Lithium metal batteries are dangerous goods, UN No.3090. Therefore they are generally subject to transport regulations, depending on the transport mode. However, most Xeno Lithium Batteries listed in the product data catalogue are exempted from the regulations if the following conditions are given:

**A.** The batteries have not more than 2g lithium content, each cell not more than 1g lithium content.
**B.** The batteries have passed the UN tests.
**C.** The batteries shall be packed in inner packaging that completely enclose them. They shall be protected so as to prevent short circuits.
**D.** The package and the shipping documents are marked with a notice indicating that it contains lithium batteries and shall –if damaged- be quarantined, inspected and repacked.
**E.** The gross mass dose not exceed 35kg per package(2.5Kg for passenger craft)
**F.** The packing shall be strong and capable of withstanding a 1.2m drop test.
**G.** For more conditions see special provision 188 **(ADR/RID/IMDG-Code)** and section 2 of packing instructions 968-970 **(IATA DGR)**

- *XenoEnergy lithium batteries meet the requirement of each test in the UN Manual Tests and Criteria (8 tests), Part III, subjection 38-3 through the approval of UL tests (the most reliable US safety requirement) including Altitude, Temperature, Vibration, Shock, Internal Short Circuit, Impact, Overdischarge and Forced discharge.*

**Conclusion (Delivery of Xeno Batteries)**

**By Air** (IATA 2011, US DOT)
Only cargo aircraft
Under 2.5kg or 35kg per package

**By Road / Rail** (ADR2009)
Under 30 kg per package

**By Sea** (IMDG code 2002)
Under 30 kg per package

## 15. Regulatory Information

N/A

## 16. Other Information

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