Section 1 – Identification

1.1 **Product Name and Description:**

Primary Lithium Thionyl Chloride (Li-SOCl2) or Metal, Non-rechargeable, Non-venting cells and batteries.
This data sheet covers cylindrical, wafer and prismatic model 3.6V series, including:
ER: 14250, 14335, 14505, 17335, 17505, 18505, 25500, 26500, 34615, 341245, 32065, 32100, 22G68, 2450;
BL: -4PN, -5PN, -7PN, -16PN; and the battery packs assembled with the above cells.

1.2 **Supplier**

US Office Address

BiPOWER CORP.
2560 Corporate Place, Suite D203
Monterey Park, CA 91754
USA

Telephone Numbers For Information

Emergency Telephone: (323) 981-9498
Fax: (323) 981-9468

Date of Revision: October-30-2023

Section 2 – Hazard(s) Identification

The lithium cell/battery covered in this data sheet is hermetically sealed in a stainless steel container and not hazardous if used as recommended by the manufacturer.

Under a normal condition of use, the electrode materials and electrolyte contained in a cell/battery are non-reactive provided the battery integrity is maintained. Exposure to content inside the sealed battery will not occur unless the battery leaks, or is mechanically, electrically or thermally abused.

Warning: the cells/batteries should not be short circuit, recharged, punctured, incinerated, crushed, immersed in water, forced discharge, or exposed to a temperatures above the declared operation temperature range. Risk of fire or explosion may occur in the above condition of abuse.

Section 3 — Composition/Information on Ingredients

CHEMICAL NAME	CAS NUMBER	Weight %	OSHA (PEL*)	ACGIH (TLV*)
Lithium Metal (Li)	7439-93-2	3.5~5%	N/A	N/A
Thionyl Chloride (SOCl2)	7719-09-7	40~45%	5 mg/m^3	0.2 ppm
Carbon (C)	1333-86-4	3~6%	3.5 mg/m^3	3 mg/m^3
Aluminum Chloride (AlCl3)	7446-70-0	1~5%	2 mg/m^3	N/A
Lithium Chloride (LiCl)	7447-41-8	<0.5%	15 mg/m^3	10 mg/m^3
Tetrafluoroethylene (C2F4)n	9002-84-0	<0.5%	N/A	N/A
Steel, nickel, glass	N/A	Balance	N/A	N/A

* PEL (Permissible Exposure Limit) & TLV (Threshold Limit Value) are determined by OSHA and ACGIH respectively.

Section 4 - First-Aid Measures

In case of battery rupture, major leakage or explosion, evacuate all workers and quarantine the contaminated area. Provide good ventilation to clear out any corrosive fumes, gases or the pungent odor. Seek immediate medical attention if necessary.

Eyes - If exposed to internal components of the battery, flush eyes with running water for at lease 15 minutes (remove contact lenses if possible) and then seek medical attention.

Skin - If exposed to internal components of the battery, flush skin with running water for at lease 15 minutes and then seek medical attention.

Inhalation - Content of leaked batteries may be irritating to respiratory passage. Move the person to fresh air and seek medical attention if irritation persists.

Ingestion - If mouth irritation or burning occurs, rinse mouth with water for at least 15 minutes; DO NOT induce vomiting; Seek immediate medical attention.

Section 5 - Fire-Fighting Measures

Flash Point: N/A	Lower Explosive Limit (LEL): N/A	Auto-Ignition: N/A
Flammable Limit in Air: N/A	Upper Explosive Limit (UEL): N/A	

Extinguishing Media:

1. If the fire is in its incipient (beginning) stage, carbon dioxide extinguishers or copious quantities of water are effective to cool down the involved lithium batteries; Use any extinguishing media appropriate for the surrounding area.
2. If the fire has progressed to where the lithium metal is exposed (deep red flame), Use only Lith-X (Class D extinguishing agent); DO NOT use water, sand, CO2, Halon,dry powder or soda ash extinguishers.

Special Fire Fighting Procedures:

Respiratory protection: Wear NIOSH approved Self-Contained Breathing Apparatus and chemical apron.

Skin protection: Wear protective clothing and equipment to prevent body contact with electrolyte solution.

Eye protection: Safety glasses are recommended.

Causes of unusual fire or explosion:

Lithium batteries may catch on fire or explode if they are abusively used or handled, such as excessive heat (over 100°C for regular and over 150°C for high temperature batteries), recharged, over-discharged (below 0V), punctured, crushed or incinerated.

Section 6 - Accidental Release Measures

Procedures to contain and clean up leaks and spills:

Under a normal condition of use, a battery is hermetically sealed and not hazardous. Leakage or release of hazardous materials contained within a battery would be possible under abusive conditions.

In the event of battery rapture and leakage: contain the spills and ventilate the contaminated area. Cover the spills or leakage with sodium carbonate (Na_2CO_3) or 1:1 mixture of soda ash and slaked lime.

Keep spill/waste away from water, rain, snow or moisture. Place them in approved containers and dispose them according to the local, state or federal regulations.

Waste disposal methods:

Product decomposed by water must be neutralized. It may be added to waste water if it is sufficiently diluted.

Neutralizing agents:

Sodium carbonate (Na_2CO_3) or 1:1 mixture of soda ash and slaked lime.

Section 7 - Handling and Storage

Precautions:

Avoid any contact with the contents in case of rupture, leakage or explosion. Follow the procedures in Section 6 to dispose the spills or waste. Keep and separate batteries in non conductive (i.e. plastic) trays.

Warning:

Lithium metal batteries are non-rechargeable;
Do not charge or recharge;
Do not over-discharge (discharge below 2.0V);
Do not short circuit, disassemble, open, alter or solder directly to;
Do not crush, pierce, incinerate or expose to water;
Do not heat above the declared operating temperature range of the product.
Do not mix batteries of different types and brands.
Do not mix new and used batteries.

Storage:

Recommended storage at room temperature 20ºC-30ºC (68°F-86°F); Store in a dry and ventilated area; Do not place the battery near heating or electrical equipment, nor expose to direct sunlight for a long period. Elevated temperatures can result in shortened battery life and degrade performance. Do not store batteries in high humidity environment for a long period.

Section 8 - Exposure Controls/Personal Protection

In case of leakage or exposure of internal components/materials:

Respiratory Protection:	Wear Self-Contained Breathing Apparatus or NIOSH approved Acid Gas Filter Mask;
Protective Gloves:	Use Nitrile or PVC gloves at least 15 mil thick;
Eye Protection:	Use ANSI approved chemical worker safety goggles or face shield;
Ventilation: Other	Use a well-designed mechanical ventilation to exhaust vapors gas;
Equipment:	Wear protective acid resistant clothing.
Work Hygienic Practice:	Use good hygiene practice; Never store or use food/drink near contents. Wash hands after each handling and before drinking, eating or smoking.

Section 9 - Physical and Chemical Properties

Melting Point:	N/A	Specific Gravity (H_2O=1):	N/A
Boiling Point:	N/A	Solubility in Water:	N/A
Volatile by Volume%:	N/A	Density (g/cc):	> 1
Vapor Pressure (mm Hg):	N/A	PH value:	N/A
Evaporation Rate:	N/A	Appearance:	Solid
Vapor Density (Air=1):	N/A	Odor:	pungent odor if leaking

Section 10 - Stability and Reactivity

Stability: The batteries are stable under normal operation and storage conditions.

Hazardous Polymerization: will not occur.

Materials to avoid: water, strong acid or alkali solutions, oxidizing agents.

Conditions to avoid: mechanical, electrical and thermal abuse, such as short-circuit, recharge, over-discharge, heating;

Hazardous decomposition products: Hydrogen (H_2) and Lithium hydroxide (LiOH) are produced in case of reaction of lithium metal with water.

Chlorine (Cl_2), Sulfur dioxide (SO_2, SO_3), Disulfur Dichloride (SCl_2, S_2Cl_2) and Lithium oxide (Li_2O) are produced in case of thermal decomposition of Thionyl Chloride above 150°C.

Hydrochloric acid (HCl) and Sulfur dioxide (SO_2) are produced in case of reaction of thionyl chloride with water at room temperature.

Section 11 - Toxicological Information

Threshold Limit Value (TLV): N/A

Health hazard acute & chronic: Inhalation, skin contact, eye contact and ingestion are not likely by exposure to sealed battery.

Inhalation, skin contact and eye contact are possible when the battery is opened. Exposure to internal contents, the corrosive fumes are extreme irritating to skin, eyes and mucous membranes. Overexposure can cause symptoms of non-fibrotic lung injury and membrane irritation.

Carcinogenicity - NTP:	No
Carcinogenicity - IARC:	No
Carcinogenicity - OSHA:	No

Explanation of Carcinogenicity: No ingredient of a concentration 0.1% or greater is listed as a carcinogen or suspected carcinogen.

Signs and symptoms of overexposure: Exposure to leaking electrolyte from ruptured or leaking battery may cause:

Inhalation:	Can cause burns and irritation of the respiratory system, coughing, wheezing and shortness of breath.
Eyes:	Redness, tearing, burns. The electrolyte is corrosive to all ocular tissues.
Skin:	The electrolyte is corrosive and causes skin irritation and burns.
Ingestion:	The electrolyte solution causes tissue damage to throat and gastro/respiratory track.

Medical condition and aggravated by exposure:

Preexisting skin, asthma and respiratory diseases are generally aggravated by exposure to liquid electrolyte vapors or liquid.

Section 12 - Ecological Information

1. The cell/battery does not present environmental hazard when being properly used or disposed.
2. The cell/battery does not contain mercury, cadmium, or lead.
3. The internal components can harm marine environments. Avoid any release to waterways, groundwater, or waste water systems.

Section 13 - Disposal Considerations

1. Waste disposal must be in accordance with the applicable regulations and laws.
2. Disposal of the Lithium batteries should be performed by permitted, professional firms knowledgeable in Federal, State or Local requirements of hazardous waste treatment and hazardous waste transportation.
3. Incineration should never be performed by battery users, but by trained professional in authorized facilities with proper gas and fume treatment.
4. Recycling of battery should be done in authorized facilities.

Section 14 - Transport Information

The regulations that govern the transport of primary lithium (metal) and rechargeable lithium ion (including polymer) cells and batteries include the International Civil Aviation Organization (ICAO) Technical Instructions and International Air Transportation Association (IATA) Dangerous Goods Regulations and International Maritime Dangerous Goods (IMDG) Code.

The transportation of lithium batteries of all types within, to and from the the United States are governed by US DOT CFR 49 Part 171-180 of the US Hazardous Materials Regulations (HMR). CFR 49 Part §173.185(c) and the Special Provisions contained in §172.102 provide information on exceptions and packaging based on details of lithium content, weight, tests and classifications.

Shipping names: Lithium metal cells or batteries;

UN number 3090: lithium metal cells or batteries;

UN number 3091: equipment containing or packed with lithium metal cells or batteries;

Hazard classification: Miscellaneous Class 9 (restricted to transport);

Shipping information: All lithium cells or batteries offered for transportation must be of the type proven to meet the criteria in Part III, sub-section 38.3 of the UN Manual of Tests and Criteria.

Packing information: Packaging of lithium cells/ batteries alone or with or in equipment for transportation is regulated by IATA/ICAO the 64th Edition of the IATA Dangerous Goods Regulations (DGR) Packing Instruction PI968, PI969 and PI970, IMO code SP188, SP230 and P903, and ADR code SP188, SP230 and P903.

Prohibition: All lithium cells or batteries are forbidden for transport aboard passenger aircraft.

Label requirements: Identification and proper labeling should comply with the applicable regulations.

Exceptions for small or medium lithium metal cells or batteries as Non-Dangerous Goods:

Under ICAO/IATA Packaging Instructions, Section II or DOT 49-CFR §173.185 (C), small and medium lithium cells or batteries are not subject to the code of regulations and treated as Non-Dangerous Goods. No Class 9 label and specification packaging are required.

IATA/ICAO/DOT regulations for air shipment:

<table>
<tr><td rowspan="2">Under Packing Instruction 968 (PI968), Section II:
Cells or batteries only (lithium content in gram);
Package Limit: ≤ 0.3 g = 2.5 kg; or
> 0.3 g but ≤ 1 g = 8 cells; or
> 0.3 g but ≤ 2 g = 2 batteries</td><td>Under Packing Instruction 969 (PI969), Section II:
Cells or batteries contained in a package with associated battery-powered equipment;</td></tr>
<tr><td>Under Packing Instruction 970 (PI970), Section II:
Cells or batteries installed in equipment;</td></tr>
</table>

ADR/RID/IMDG/DOT Surface (Truck/Sea/Rail) Transportation:

1. The lithium content may not exceed 1 gram for a lithium metal cell or 2 grams for a lithium metal battery.
2. For transportation by highway or rail only, the lithium content of the cell or battery may be increased to 5 grams for a lithium metal cell and 25 grams for a lithium metal battery.

For detailed marking and packaging requirements for the cells/batteries not subject to the regulations, please refer to the special code of regulations issued by the above authorities or organizations.

Section 15 - Regulatory Information

United States

Hazard Communication Standard (29 CFR 1910.1200):	Article
CERCLA SECTION 304 Hazardous Substances:	N/A
EPCRA SECTION 302 Extremely Hazardous Substance:	N/A
EPCRA SECTION 313 Toxic Release Inventory:	N/A
EPCRA SECTION 312:	N/A
Components Listed on US Toxic Substances Control Act (TSCA) Inventory:	Yes

Europe

Registration, Evaluation, Authorization and Restriction of Chemicals (REACH):	Article
European RoHS Directive 2008/35/EC:	N/A
European WEEE Directive 2008/34/EC: Note: Applies to cells and batteries incorporated into electrical and electronic equipment, when that equipment becomes waste.	Article

1. All the cells and batteries are defined as “articles” and thus are exempt from the requirements of the Hazard Communication Standard”.
2. The internal component (thionyl chloride) is considered hazardous under the criteria of the Federal OHSA Hazard Communication Standard 29 CFR 1920.1200.
3. National Fire Protection Association: Lithium batteries are not included in the NFPA material list. Lithium metal is listed under NFPA 485.

Section 16 - Other Information

Disclaimer: The information contained within is provided as a service to our customers and for their information only. The information and recommendations set forth herein are made in good faith and are believed to be accurate as of the date of preparation or revision. BIPOWER makes no warranty expressed or implied, and disclaims all liabilities from reliance on it.

References: OSHA 29 CFR 1910.1200(g) and Appendix D. United Nations Globally Harmonized System of Classification and Labelling of Chemicals (GHS), Eighth Revised Edition, United Nations, 2019. These references and other information related to the revised Hazard Communication Standard can be found on OSHA's Hazard Communication Safety and Health Topics page, located at: http://www.osha.gov/dsg/hazcom/index.html.