

Material/Product Safety Data Sheet (MSDS/PSDS)

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1. Identification of the product and supplier

Identification of the product: Lithium metal batteries/Thin cell Lithium Manganese Dioxide batteries (Li-MnO₂)
Non-rechargeable batteries

Manufacturer: ABLE NEW ENERGY Co., Ltd
Address: 1Longwo Industrial Zone, Longtian Community,
Kengzi Office, Pingshan New District, Shenzhen,
China, ZIP: 518122
Telephone: +86-755-29807563/ 7477/ 7564/ 7561
Fax: +86-755-29807510
E-mail: yyzheng@able-battery.com
Emergency Phone: USA 800-424-9300
International 703-527-3887

2. Composition and information about the ingredients

Each cell consists of a laminated aluminium foil container containing a number of chemicals and materials of construction of which the following could potentially be hazardous upon release.

	Appr . Percent of Total Weight (%)	Chemical Abstracts Service #
Lithium (Li)	1.5~6	7439-93-2
Ethyl Methyl Carbonate(C ₄ H ₈ O ₃)	4.5~7.5	623-53-0
Ethylene Carbonate, C ₃ H ₄ O ₃	3~5.5	96-49-1
Propylene Carbonate (C ₃ H ₆ CO ₃)	2.5~4.5	108-32-7
Bis(trifluoromethane)sulfonimide lithium, LiTFSi	2~4	90076-65-6
Manganese Dioxide (MnO ₂)	70~80	1313-13-9

3. Hazards identification

Do not short circuit, recharge, puncture, incinerate, crush, immerse, force discharge or expose to temperatures above the declared operating temperature range of the product. Risk of fire or explosion. The Lithium-Manganese dioxide batteries described in this Product Safety Data Sheet are sealed units which are not hazardous when used according to the recommendations of the manufacturer.

Under normal conditions of use, the electrode materials and electrolyte they contain are not exposed to the outside, provided the battery integrity is maintained and seals remain intact. Risk of exposure only in case of abuse (mechanical, thermal, electrical) which leads to the activation of safety valves and/or the rupture of the battery containers. Electrolyte leakage or battery vent/explosion/fire may follow, depending upon the circumstances.

4. First aid measures

Inhalation: Remove from exposure, rest and keep warm, In severe cases obtain medical attention.

Skin contact: Wash off skin thoroughly with tap water. Remove contaminated clothing and wash before reuse. In severe cases obtain medical attention.

Eye contact: Irrigate thoroughly with water for at least 15 minutes. Obtain medical attention

Ingestion: Wash out mouth thoroughly with water and give plenty of water to drink. Obtain medical attention.

Further treatment: All cases of eye contamination, persistent skin irritation and casualties who have swallowed this substance or been affected by breathing its vapours should be seen by a Doctor.

5. Fire-fighting measures

CO₂ extinguishers or copious quantities of water-based foam can be used to cool down burning Li-MnO₂ cells and batteries, as long as the extend of the fire has not progressed to the point that the Lithium metal they contain is exposed.

Do not use for this purpose sand, dry powder or soda ash , graphite powder or fire blankets.

Use only metal (Class D) extinguishers on raw lithium.

Extinguishing Media: Use water or CO₂ on burning Li-MnO₂ cells or batteries and class D fire extinguishing agent only on raw lithium.

6. Accidental release measures

Do not breathe vapours or touch liquid with bare hands.

If the skin has come into contact with the electrolyte it should be washed thoroughly with water.

Earth or sand should be used to absorb the exudation, seal leaking battery and earth in a heavy duty polythene bag and dispose of as Special Waste in accordance with local regulations.

7. Handling and storage

Handling: Do not short circuit or expose to temperatures above the temperature rating of battery. Do not recharge, over-discharge, force discharge, immerse, puncture or crush.

Storage: Store in a cool place but prevent condensation on cells and batteries. Elevated temperatures can result in shortened battery life and degrade performance. Do not store batteries in high humidity environments for long periods of times.

Other: Lithium Manganese dioxide batteries are not rechargeable and should not be tentatively charged.

Follow Manufacturers recommendations regarding maximum recommended currents and operating temperature range.

Applying pressure on deforming the battery may lead to disassembly.

8. Exposure controls/personal protection

	Occupational exposure standard	Compound Tetrahydrofuran 1,2 Dimethoxyethane	8hr TWA 50 ppm 5 ppm	15min TWA 100 ppm -	SK - -
	Respiratory protection	In all fire situations, use self-contained breathing apparatus.			
	Hand protection	In the event of leakage wear gloves.			
	Eye Protection	Safety glasses are recommended during handling			
	Other	In the event of leakage, wear chemical apron.			
** Can be absorbed through broken skin					

9. Physical and chemical properties

Appearance: Cylindrical or prismatic shape

Odour: If leaking, smells of medical ether.

pH: Not applicable as supplied.

Flash Point: Not applicable unless individual components exposed.

Flammability: Not applicable unless individual components exposed.

Relative density: Not applicable unless individual components exposed

Solubility (water): Not applicable unless individual components exposed

Solubility (other): Not applicable unless individual components exposed

10. Stability and reactivity

Product is stable under conditions described in Section 7.

Conditions to avoid: Heat above 70°C or incinerate. Deform. Mutilate. Crush. Pierce. Disassemble. Recharge. Short circuit. Expose over a long period to humid conditions.

Materials to avoid: Oxidising agents, alkalis, water.

Hazardous reactions: Lithium metal reacts with water to produce highly flammable gasses.

Hazardous decomposition reactions: Toxic Fumes, and may form peroxides.

11. Toxicological information

Signs & symptoms: None, unless battery ruptures. In the event of exposure to internal contents, vapour fumes may be very irritating to the eyes and skin.

Inhalation: Lung irritant.

Skin contact: Skin irritant

Eye contact: Eye irritant

Ingestion: Poisoning if swallowed

Medical conditions generally aggravated by exposure: In the event of exposure to internal contents, moderate to severe irritation, burning and dryness of the skin may occur, Target organs nerves, liver and kidneys.

12. Ecological information

Mammalian effects: None known at present.

Eco-toxicity: None known at present.

Bioaccumulation potential: Slowly Bio-degradable.

Environmental fate: None known environmental hazards at present.

13. Disposal consideration

Do not incinerate, or subject cells to temperature in excess of 70°C, Such abuse can result in loss of seal leakage, and/or cell explosion. Dispose of in accordance with appropriate local regulations.

14. Transport information

Restriction for the transport: Codes and classifications according to the United Nation Regulations.

Label for conveyance: For the single cells and multicell battery packs which are non-restricted to transport, use lithium batteries inside label.

In all cases, refer to the product transport certificate issued by the authorized laboratories.

Hazard classification: None Shipping name: Lithium Metal Batteries.

International convention

Road transport: not hazardous in accordance to ADR

Rail transport: not hazardous in accordance to RID

Sea transport: not hazardous in accordance to IMDG

Air transport: not hazardous in accordance to ICAO

However, since it corresponds to Section II of PI968 of IATA-DGR or special provision 188 of IMO-IMDG Code, these batteries and cells can be conveyed normally. Also these batteries and cells have been approved test of UN Test 38.3. And it does not contain any recalled/ defective battery. They must be transported according to the requirement in Section II of PI968 under the 58th IATA is met.

Note: For lithium metal-Maximum of

- 1 gram of lithium metal per cell; and
- 2 grams of lithium per battery

Packing Instruction 968, Section II

Package Limit:

≤0.3g = 2.5kg; or

>0.3g but ≤1g = 8 cells; or

>0.3g but ≤2g = 2 batteries

15. Regulation information

USA: This MSDS meets/exceeds OSHA requirements.

Canada: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all of the information required by those regulations.

International: This MSDS conforms to European Union (EU), the International Standards Organization (ISO) and the International Labour Organization (ILO) and as documented in

ANSI (American National Standards Institute) Standard Z400.1-1993.

16. Other information

This information has been compiled from sources considered to be dependable and is, to the best of our knowledge and belief, accurate and reliable as of the date compiled. However, no representation, warranty (either expressed or implied) or guarantee is made to the accuracy, reliability, or completeness of the information contained herein.

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