

## Material/Product Safety Data Sheet (MSDS-PSDS)

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### 1. Identification of the product and supplier









Identification of the product: Lithium Manganese Dioxide single cells and multi-cell battery packs (Li-MnO<sub>2</sub>)  
non-rechargeable batteries

Manufacturer: Able New Energy Co., Ltd  
Address: 1Longwo Industrial Zone, Longtian Community, Longtian street, Pingshan District,, Shenzhen, China, ZIP: 518122

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Emergency Phone: USA 800-424-9300  
International 703-527-3887

### 2. Composition and information about the ingredients

Each cell consists of an hermetically sealed metallic 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 #	CHIP Classification
Lithium (Li)	2.8~3.2	7439-93-2	 
Carbon black (C)	1.0~2.2	1333-86-4	NONE KNOWN
Propylene Carbonate (C <sub>3</sub> H <sub>6</sub> CO <sub>3</sub> )	7.5~8.6	108-32-7	
1,2 Dimethoxyethane (CH <sub>3</sub> OCH <sub>2</sub> CH <sub>2</sub> OCH <sub>3</sub> )	2.0~2.4	110-71-4	 
Tetrahydrofuran (C <sub>4</sub> H <sub>8</sub> O)	6.8~7.5	109-99-9	 
Manganese Dioxide (MnO <sub>2</sub> )	38.2~42.5	1313-13-9	
Amount varies depending on cell size			

### 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

CO<sub>2</sub> extinguishers or copious quantities of water-based foam can be used to cool down burning Li-MnO<sub>2</sub> 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 CO<sub>2</sub> on burning Li-MnO<sub>2</sub> 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.

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

Hazard classification: Class 9

UN Number: UN3090

Shipping name: Lithium Metal Batteries.

Packing Group: II

CAS: See Part 2

EmS No: F-A, S-I

ADR class: Class 9

**Air transport: class 9 dangerous goods in accordance to the 62<sup>th</sup> IATA.**

Label: For the single cells and multicell battery packs which are restricted to transport (assigned to the Miscellaneous Class 9), use Class 9 Miscellaneous Dangerous Goods and lithium batteries inside label.

Also these batteries and cells have been approved UN manual of test and criteria, part III, sub-section 38.3. And it does not contain any recalled/ defective battery.

They must be transported as dangerous goods according to the requirement in Section IB of PI968 under the 61<sup>th</sup> edition of IATA.

For emergency information, call Chemtrec 1-703-527-3887.

**Sea transport: not hazardous in accordance to IMDG**

IMDG Code: SP188

Marine pollutant: None

However, since it corresponds to special provision 188 of IMO-IMDG Code, these batteries and cells can be shipped as not restricted goods.

## 15. Regulation information

Here below are shown the nature of special risks and the advices of caution.

Risk phrases	Lithium	R14/15 R34	Reacts violently with water, liberating extremely flammable gases. Causes burns.
	Manganese	R20/22	Harmful by inhalation and if

	<b>Dioxide</b>		<b>swallowed.</b>
	<b>Tetrahydrofuran</b>	<b>R11 R19 R36/37</b>	<b>Highly Flammable May form explosive peroxides. Irritating to eyes and respiratory system.</b>
	<b>Propylene Carbonate</b>	<b>R36</b>	<b>Irritating to the eyes.</b>
	<b>1,2 Dimethoxyethane</b>	<b>R11 R19 R20</b>	<b>Highly Flammable May form explosive peroxides Harmful by inhalation</b>
<b>Safety phrases</b>	<b>Lithium</b>	<b>S1/2 S8 S43 S45</b>	<b>Keep locked up and out of reach of children. Keep container dry In case of fire, use Lith-X (Graphite based) fire extinguisher. Never use water. In case of accident or if you feel unwell, seek medical advice immediately.</b>
	<b>Manganese Dioxide Tetrahydrofuran</b>	<b>S25  S2 S16 S29 S33</b>	<b>Avoid contact with eyes.  Keep out of the reach of children. Keep away from sources of ignition - No Smoking. Do not empty into drains. Take precautionary measures against static discharges.</b>
	<b>Propylene Carbonate</b>	<b>S24/25</b>	<b>Avoid contact with skin and eyes.</b>
	<b>1,2 Dimethoxyethane</b>	<b>S24/25</b>	<b>Avoid contact with skin and eyes.</b>
<b>UK regulatory references</b>	<b>Classified under CHIP</b>		

## 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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